NANTICOKE WATER CHEMISTRY 1976

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Ministry of the Environment

The Honourable
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Minister

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NANTICOKE WATER CHEMISTRY
1976

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Ministry of the Enviroment
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SUMMARY

Twenty-one water quality related parameters were monitored at Nanticoke 8 times in 1976. As in previous years the area was found spatially homogeneous but temporally non-homogeneous. Average seasonal changes show mutual dependence between nutrients and phytoplankton growth. The rapid increase in the phytoplankton production is followed by a decline in nutrients as the nutrients are being ultilzed and removed from water at a faster rate. Long term analysis was carried out on seasonally adjusted data. Slight decreases in many parameters are evident with a large relative decrease in ammonia. The decrease in ammonia concentration is offset by an increase in nitrate concentration and no significant trend is evident for total nitrogen. Generally the 1976 data were similar to data collected in previous years.

INTRODUCTION

Monitoring of the water quality and other environmental factors in the Nanticoke area of Lake Erie was initiated in 1969. In 1976, samples were collected 8 times throughout the year and analyzed for twenty one water quality parameters. The 1976 results are presented and analyzed in relation to the previous years data in this report.

SURVEY OPERATION

Ten sampling locations were sampled eight times in 1976 (Figure 1). Sampling at location 1008 was discontinued in 1975 because of its proximity to the site of the Stelco dock. Stations 1041 (east of the dock) and 1042 (west of the dock) introduced in 1975 were sampled instead in 1976. Water samples were collected one metre below the surface and one metre above the bottom with the exception of shallow stations 518, 1040 and 1042 where mid-depth samples were collected. Water temperature and dissolved oxygen were measured on site. All other analyses were carried out in the MOE Toronto Laboratory.

Analysis of 1976 Data

The complete list of water quality parameters is given in Appendix 1, Tables 1-21. The average values per station are given in Table 1, averages for each sampling date are listed in Table 2. The data were tested for spatial and temporal variation by a two-way analysis of variance with results shown in Table 3. As in previous years (Polak, 1975, 1977) the area is generally spatially homogeneous with the time variation significant in most cases. However, there are exceptions. Between station differences of surface values of turbidity, suspended solids and secchi disc depths are significant. This is understandable as the shallow stations contain more particles suspended from the bottom than the deeper ones. The suspended solids particles also affect turbidity and secchi disc depths. The differences between the dates are mostly significant, again with exceptions. Bottom pH, suspended solids, alkalinity, nitrates plus nitrites do not change with time perhaps due to the relative insulation of the bottom water layers and overall small variation in the parameters. All the data on total phosphorus, filtered reactive P and total Kjeldahl nitrogen are temporally homogeneous. These parameters did not change very much at all as can be seen in Tables 1 and 2 and they are also spatially homogeneous.

Seasonal Changes and Time Trends

With each additional year the determination of the long-term trends improves. Eight years data base is long enough to determine the overall trend, however, it is not long enough to allow the analysis of the data for periodical changes related to periods of several years. This could be done by time series analysis which requires data lengths of at least ten times longer then the significant period.

Generally, the characteristic changes of the time series can be classfied into four main types (Spiegel, 1961):

a. long-term changes,
b. cyclical changes,
c. seasonal changes, and
d. irregular or random changes.

Since we are interested in the long-term changes the other types of changes should be removed if possible before the trend analysis is performed. As mentioned, the data could not be analyzed for cyclical variation as yet, because longer-term results are needed. If there is any cyclical variation over the year which is different from seasonal changes it cannot be resolved at this time. Random and irregular changes could not be removed either, and thus only the seasonal changes are subject to adjustment.

As shown above, most of the 1976 chemistry data are non-homogeneous over time; they tend to change throughout the season. The average seasonal changes can be analyzed. The relative measure of concentration a_r was defined as:

$$a_r = (a-a_{min})/(a_{max}-a_{min})$$

where a is the water quality parameter at certain month and a_{max} and a_{min} are the maximum and minimum values of this property throughout the year. Values of a_r for various parameters were calculated and averaged over the time period and are shown in Figure 2. The advantage of this form of presentation is that all variables are represented by changes from 0 to 1, and this facilitates comparison among changes in individual parameters and the succession of these changes. It is typical for the Nanticoke data and comparable to data for other water bodies (Wildung, Schmidt and Gahler, 1974, Wood, Gibson, 1974, Burns and Ross, 1972) that the nutrients expressed as total P and total N start at high levels early in the season (May) and then decrease in June. These are followed by increases in July. The minimum values are reached in August and September and are followed by increases during October to November. Comparison of this pattern with the changes in phytoplankton crop suggest mutual dependence. Phytoplankton crop show a local maximum in April followed by the minimum in June. This minimum in phytoplankton crop is followed by a local maximum in nutrients as the nutrients are being utilized at a slower rate. The rapid increase in phytoplankton crop through August and September is accompanied by a rapid decline in nutrients.

The data collected at nine stations from 1969 to 1975 were used for the trend analysis. For the second half of 1975 and for 1976, data for Station 1008, which was discontinued in 1975, were replaced by the averages for Station 1041 and 1042. During some of the years only the mid-depth samples were collected. For the other years top

and bottom samples were averaged and used for the analysis. The determination of the trends is performed is several steps. To obtain a constant number of data points per year and thus to remove bias for years with more than average numbers of samples the data were linearally interpolated to the middle of the month (April to November). This data set was then analysed. The copy of the FORTRAN program for the analysis of the long-term trends is given in Appendix II.

A monthly seasonal index, defined as the ratio of the monthly value to the average value for the year, was calculated and averaged for all of the eight years of the study. By dividing the monthly data by the averaged, monthly seasonal index the seasonal variation is adjusted. The raw data for turbidity, one of the parameters displaying large seasonal variations, interpolated to the middle of the month, and seasonally adjusted data for the same parameter are shown in Figure 3. As can be seen there is a smaller variation in the second data set; most of the extremes were removed. Shown as vertical bars in Figures 3 are the standard deviations of the monthly averages. The standard deviations are clearly smaller for the seasonally adjusted data. As seasonal changes are not the same every year, changes start at different dates and the monthly sampling does detect the full range of variations, it is impossible to remove all of the seasonal variation.

The seasonally adjusted data were used to calculate average change (trends) for the different parameters for the years 1969 to 1976. The results shown in Table 4 and graphically in Figure 4 are expressed as percentage change per year to allow the comparison among the different parameters. The bars in Figure 4 denote 95% significance limits of the changes. The concentrations of most of the parameters have decreased over the years. The only significant increase was in water levels and nitrates. Total N did not change significantly. The increase in nitrate was somewhat counteracted by a decrease in ammonia, however; the average change in nitrate was 0.010 mg N/l/year which is nearly twice of the average change in NH_3 (-0.0058 mg N/l/year).

When the 95% level band cross the 0 change line (Figure 4) it can be assumed that neither increase or decrease of the parameter is significant. This is true for total nitrogen, pH, phytoplankton crop, dissolved oxygen, nitrite and temperature. As mentioned, the only significant increase is for water levels and nitrates (resulting also in an increase of the sum of NO_2^- + NO_3^-). All other parameters were decreasing over the years at various rates. Whether these changes will persist and are important in the total water quality remains to be seen.

Conclusion

The 1976 water chemistry data have similar spatial and seasonal characteristics to those collected in Nanticoke since 1969. More detailed analysis of the longer-term time trends is possible and the background values are now well defined. The established base will permit comparison of future influences of the shoreline industrialization in the area and changes in water levels on the water quality.

List of References

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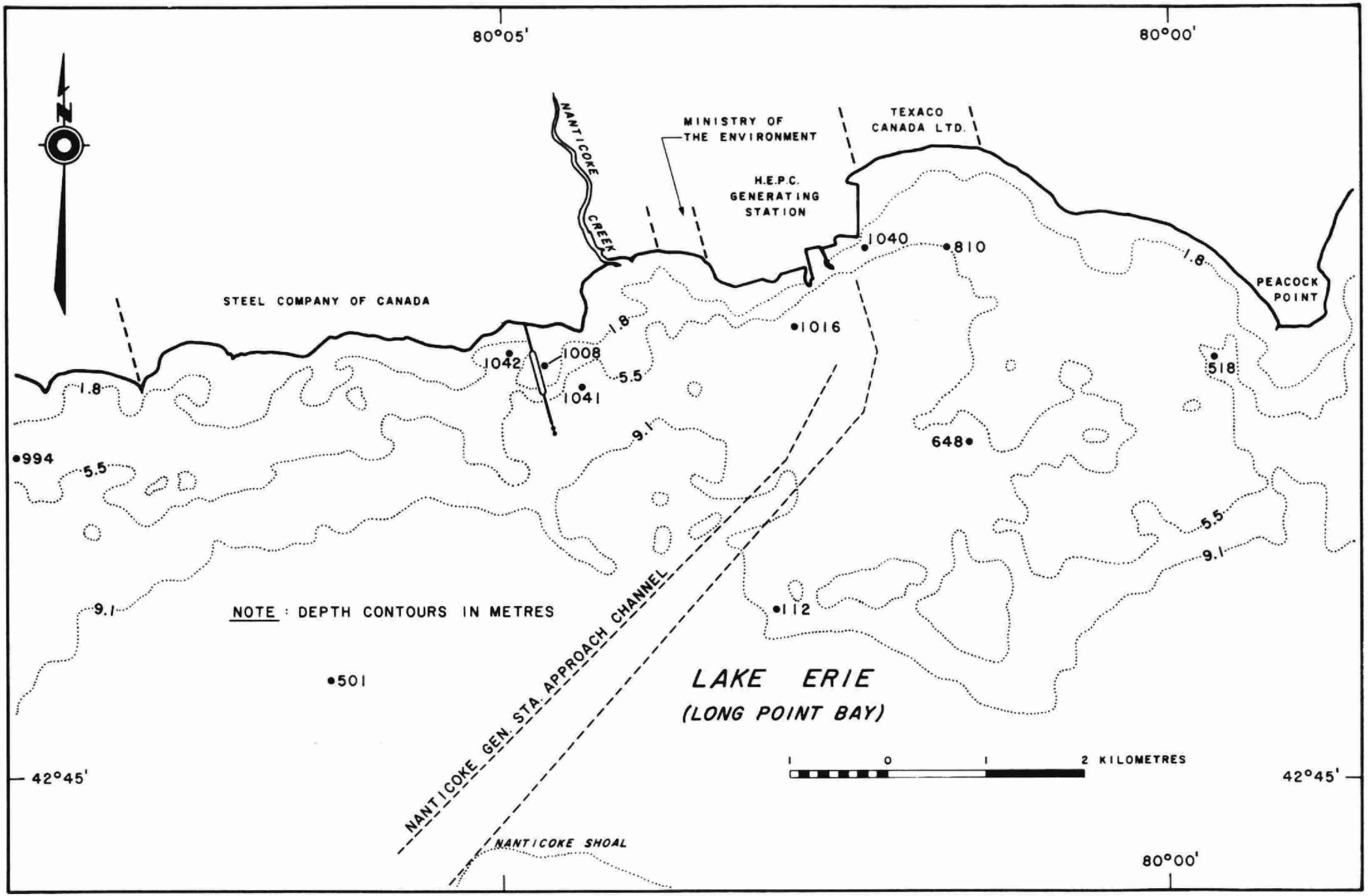

FIGURE 1 - 1976 NANTICOKE SAMPLING STATIONS.

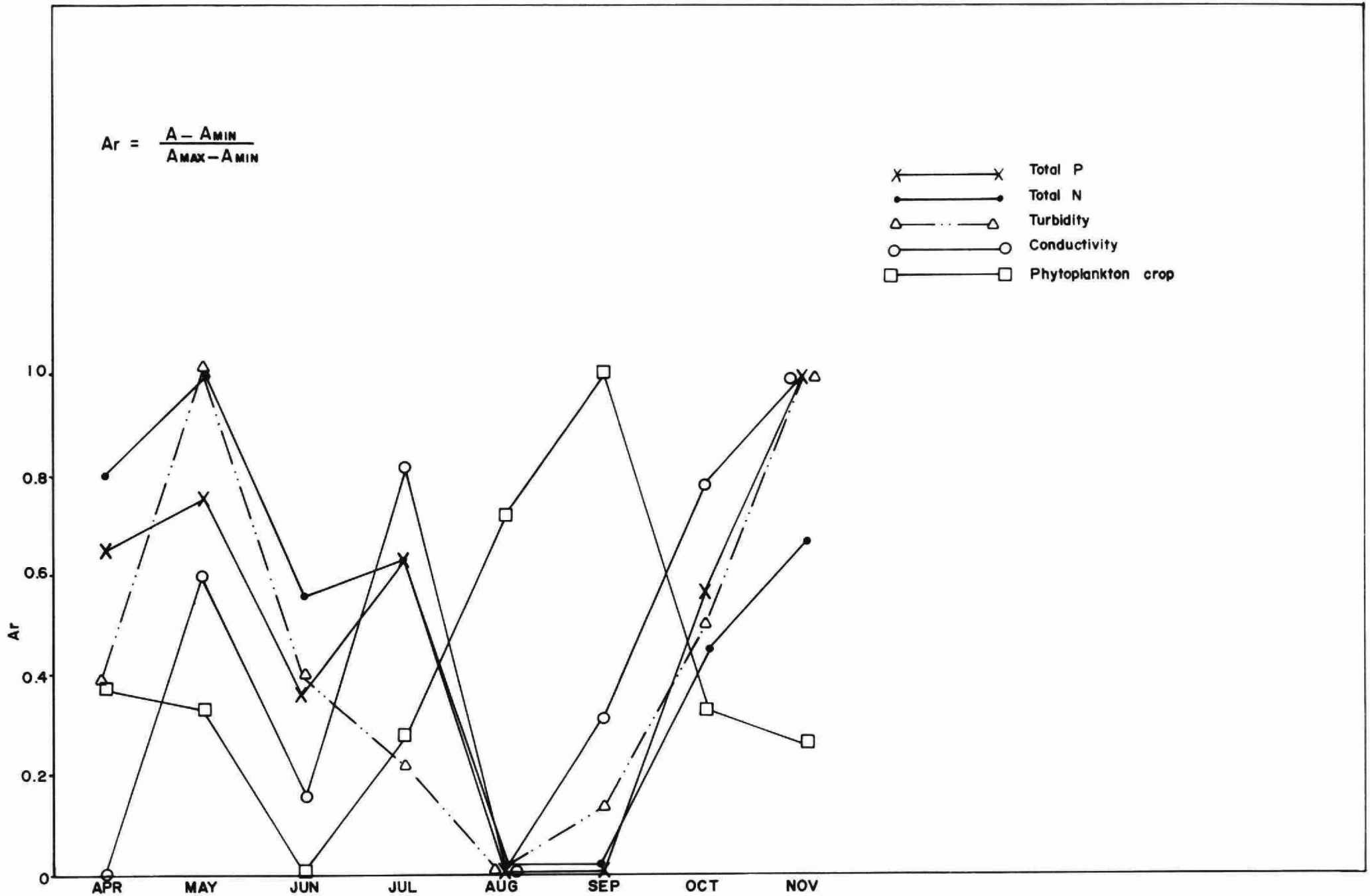

FIGURE 2 NANTICOKE-LAKE ERIE SEASONAL VARIATION-AVERAGES, 1969-1976.

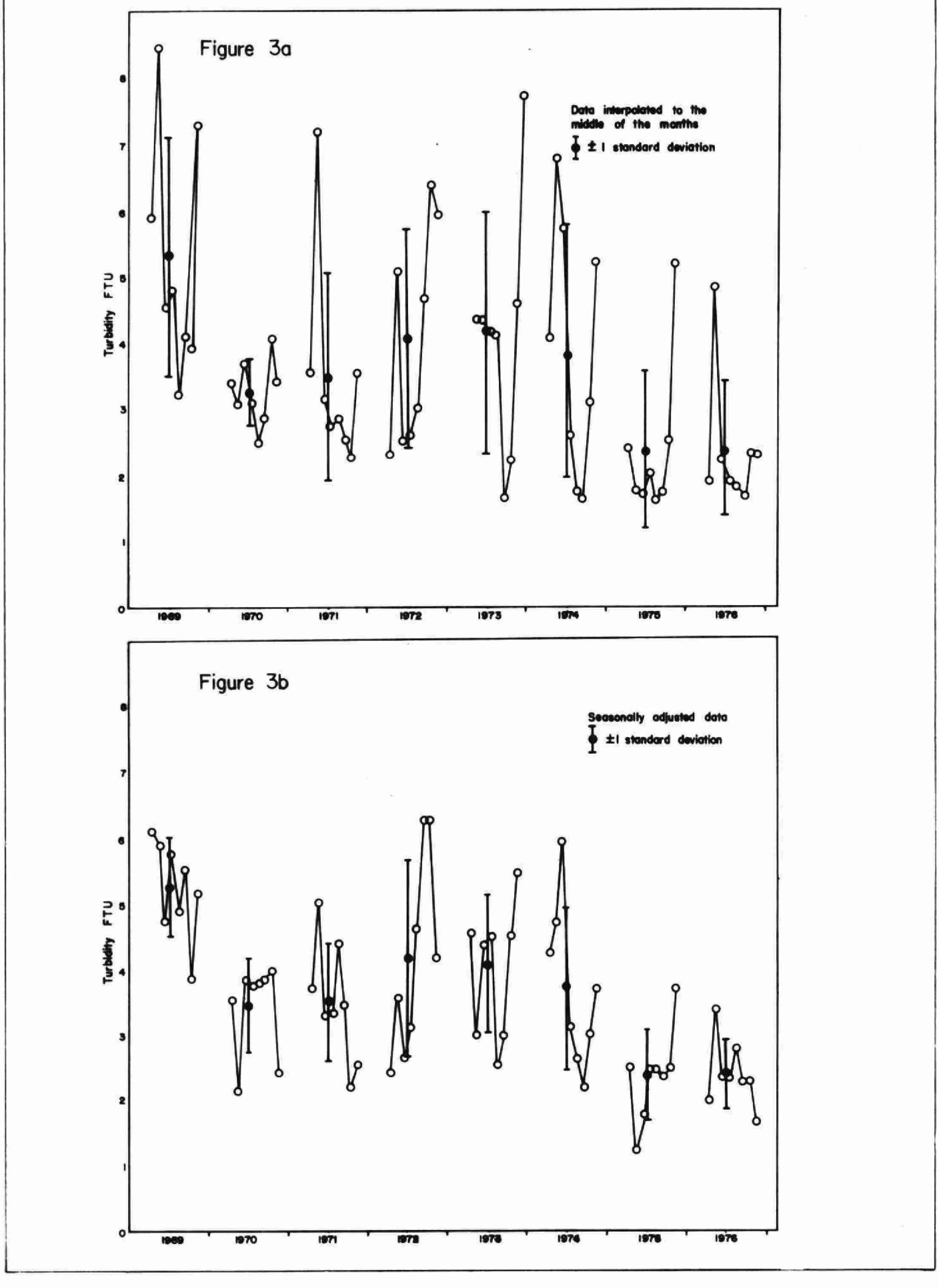

FIGURE 3 COMPARISON OF RAW AND SEASONALLY ADJUSTED TURBIDITY. NANTICOKE 1969 – 1978.

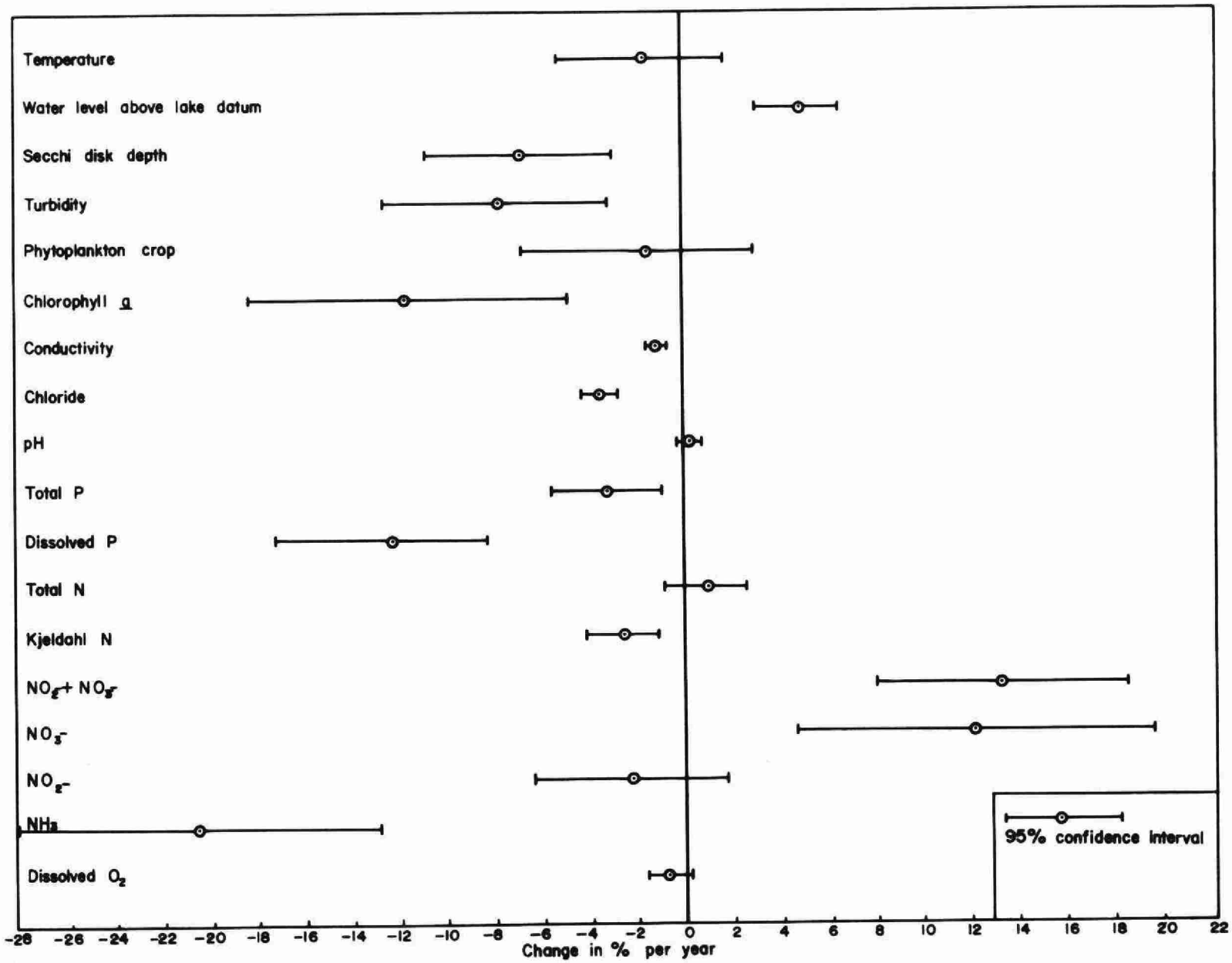

FIGURE 4 NANTICOKE-LAKE ERIE LONG TERM CHANGES, 1969-1976.

TABLE 1

Summary of Results, Area Mean Value per Date, 1976, Nanticoke Water Chemistry

Station		Temp.	BOD_5	Cond	Turb	pH	Cl-	SO_4^{2-}	Susp Solds	Alk.	Si	Secc disk	Diss O_2	Total Fe	Total P	Filt Reac P	Total Kjeld N	Filt $NO_2^- + NO_3^-$	Filt NH_3	Chlorophyll a	Chlorophyll b
		°C	mg/l	uS/cm	FTU	SU	mg/l	mg/l	mg/l	mg/l	mg/l	m	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l
112	s	13.4	.6	300	1.7	8.39	20.9	25.3	1.7	950	.09	3.3	10.3	.06	.009	.003	.234	.148	.010	2.6	.6
	b	11.3	.6	303	1.9	8.22	20.9	25.2	2.2	949	.13	-	9.2	.10	.009	.004	.226	.199	.011	-	-
501	s	13.1	.7	300	1.5	8.44	20.9	25.2	1.5	941	.08	3.9	10.3	.06	.011	.006	.276	.151	.012	2.4	.7
	b	11.1	.6	304	2.0	8.15	20.9	25.2	3.5	951	.16	-	9.2	.09	.012	.005	.246	.211	.015	-	-
518	s	14.1	.5	301	3.4	8.42	20.9	25.6	3.2	947	.09	2.0	10.1	.14	.011	.003	.244	.161	.011	3.0	.7
648	s	13.5	.5	299	1.8	8.45	20.8	25.2	1.5	942	.09	3.1	10.3	.08	.009	.003	.235	.147	.011	2.7	.6
	b	12.6	.7	299	2.0	8.38	20.0	25.2	2.5	953	.09	-	9.9	.10	.009	.003	.233	.159	.012	-	-
810	s	14.3	.4	302	3.4	8.40	20.8	25.4	3.0	958	.11	1.8	9.9	.13	.013	.003	.249	.172	.011	2.8	.6
	b	12.9	.7	303	3.4	8.32	20.9	25.1	2.7	963	.11	-	9.7	.10	.014	.003	.293	.176	.009	-	-
994	s	13.4	.4	301	2.4	8.40	20.9	25.3	2.2	945	.09	2.5	10.1	.09	.015	.007	.291	.158	.011	2.5	.7
	b	12.5	.7	302	2.6	8.30	20.7	25.2	2.8	954	.11	-	9.9	.09	.013	.005	.297	.163	.012	-	-
1016	s	12.9	.5	301	2.4	8.43	20.9	25.1	2.0	957	.13	2.3	10.1	.19	.010	.003	.297	.155	.009	2.9	.7
	b	11.8	.7	301	2.6	8.32	20.9	25.2	2.4	958	.15	-	9.5	.09	.019	.004	.251	.179	.008	-	-
1040	s	13.6	.7	303	4.1	8.38	20.8	25.7	3.8	965	.14	1.7	10.0	.17	.013	.003	.273	.167	.009	3.0	.6
1041	s	13.0	.6	302	4.1	8.40	20.8	25.7	3.7	963	.14	2.1	10.5	.20	.013	.005	.270	.164	.009	3.0	.7
	b	11.6	.6	302	3.4	8.30	20.9	25.5	3.3	963	.14	-	10.1	.15	.013	.003	.269	.182	.009	-	-
1042	s	12.9	.6	301	6.3	8.42	20.8	25.8	7.0	966	.11	1.3	10.5	.24	.016	.004	.262	.159	.009	3.5	.8

s...surface sample
b...bottom sample

TABLE 2

Summary of Results, Area Mean Value per Date, 1976, Nanticoke Water Chemistry

Date		Temp.	BOD_5	Cond	Turb	pH	Cl-	SO_4^{2-}	Susp Solids	Alk.	Si	Secc disk	Diss O_2	Total Fe	Total P	Filt Reac P	Total Kjeld N	Filt $NO_2^- + NO_3^-$	Filt NH_3	Chlorophyll a	Chlorophyll b
		°C	mg/l	uS/cm	FTU	SU	mg/l	mg/l	mg/l	mg/l	mg/l	m	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l
April 14	s	4.0	.8	296	2.1	8.39	20.3	29.4	3.5	958	.05	1.3	12.3	.28	.013	.003	.285	.210	.020	2.9	.4
	b	3.6	.9	295	1.7	8.36	20.4	29.0	3.3	963	.05	-	12.6	.22	.014	.004	.279	.202	.019	-	-
May 12	s	7.4	.6	312	6.9	8.28	19.8	24.8	-	970	.11	1.1	12.0	.32	.011	.003	.232	.255	.013	2.8	.5
	b	7.0	.6	310	4.5	8.30	20.0	24.7	-	960	.09	-	12.2	.16	.014	.004	.244	.229	.007	-	-
June 9	s	13.8	.8	297	2.8	8.53	20.9	25.0	3.2	951	.05	1.8	10.7	.10	.013	.005	.271	.127	.009	3.3	.9
	b	7.4	1.2	299	2.5	8.16	20.9	24.4	3.3	947	.05	-	9.9	.07	.015	.004	.318	.191	.016	-	-
July 7	s	17.5	.5	299	2.3	8.51	21.1	25.2	1.8	958	.09	3.2	10.9	.08	.016	.006	.300	.172	.012	3.2	.6
	b	14.8	.6	302	2.5	8.32	21.0	25.0	2.3	967	.10	-	9.0	.09	.014	.005	.249	.193	.015	-	-
Aug 3	s	19.0	.5	300	1.3	8.38	21.0	25.0	1.6	958	.15	5.3	8.5	.05	.014	.003	.298	.140	.007	1.5	.5
	b	19.1	.5	301	1.5	8.36	20.9	25.0	1.9	957	.15	-	8.3	.06	.013	.003	.244	.146	.007	-	-
Aug 31	s	19.2	.1	299	2.1	8.49	21.5	24.0	3.1	929	.14	2.8	7.2	.06	.010	.005	.218	.075	.004	3.2	.8
	b	18.4	.2	304	1.9	8.22	21.5	24.0	2.8	942	.26	-	6.2	.06	.009	.004	.239	.157	.006	-	-
Sept 30	s	13.8	.6	305	2.1	8.32	21.1	24.6	4.4	955	.14	2.2	9.2	.06	.009	.002	.222	.126	.007	3.3	.7
	b	13.0	.6	305	1.4	8.27	21.2	24.6	3.1	954	.18	-	8.8	.07	.009	.003	.227	.150	.006	-	-
Oct 13	s	13.8	-	-	5.1	-	-	-	-	-	-	1.5	-	-	.009	-	-	-	-	2.5	.9
	b	13.6	-	-	4.6	-	--	-	-	-	-	-	-	-	.013	-	-	-	-	-	-

s...surface sample
b...bottom sample

TABLE 3

Two-way Analysis of Variance, Nanticoke 1976

Parameter		Between Dates Difference Fi,j	i	j	Significance	Between Stations Difference Fi,j	i	j	Significance
Water Temperature	s	268.3	7	9	S.D.	1.34	9	7	N.S.D.
	b	116.4	7	6	S.D.	2.04	6	7	N.S.D.
BOD_5	s	12.3	6	9	S.D.	1.13	9	6	N.S.D.
	b	18.1	6	6	S.D.	0.65	6	6	N.S.D.
Conductivity	s	60.9	6	9	S.D.	1.84	9	6	N.S.D.
	b	28.2	6	6	S.D.	4.24	6	6	N.S.D.
Turbidity	s	19.2	7	9	S.D.	9.20	9	7	S.D.
	b	11.7	7	6	S.D.	3.35	6	7	N.S.D.
pH	s	9.7	6	9	S.D.	0.34	9	6	N.S.D.
	b	2.69	6	6	N.S.D.	2.60	6	6	N.S.D.
Chloride	s	51.3	6	9	S.D.	0.26	9	6	N.S.D.
	b	64.6	6	6	S.D.	1.26	6	6	N.S.D.
Sulphate	s	135.3	6	9	S.D.	1.70	9	6	N.S.D.
	b	135.0	6	6	S.D.	0.58	6	6	N.S.D.
Suspended Solids	s	4.88	6	9	S.D.	7.38	9	6	S.D.
	b	3.38	6	6	N.S.D.	1.98	6	6	N.S.D.
Total Alkalinity	s	6.43	6	9	S.D.	3.29	9	6	N.S.D.
	b	2.05	6	6	N.S.D.	0.91	6	6	N.S.D.
Reactive Si	s	12.9	6	9	S.D.	2.49	9	6	N.S.D.
	b	12.7	6	9	S.D.	1.41	6	6	N.S.D.
Secchi Disk Depth	-	36.7	7	9	S.D.	10.32	9	7	S.D.
Dissolved Oxygen	s	90.2	6	9	S.D.	0.67	9	6	N.S.D.
	b	31.5	6	6	S.D.	0.74	6	6	N.S.D.
Total P	s	2.32	7	9	N.S.D.	1.80	9	7	N.S.D.
	b	0.57	7	6	N.S.D.	1.40	6	7	N.S.D.
Filtered Reactive P	s	1.05	6	9	N.S.D.	1.14	9	6	N.S.D.
	b	2.29	6	6	N.S.D.	1.55	6	6	N.S.D.
Total Kjeldahl N	s	2.31	6	9	N.S.D.	0.49	9	6	N.S.D.
	b	2.79	6	6	N.S.D.	1.73	6	6	N.S.D.
Filtered NO_2 + NO_3	s	84.7	6	9	S.D.	1.11	9	6	N.S.D.
	b	4.04	6	6	N.S.D.	1.47	6	6	N.S.D.

Table 3 (cont'd...)

Parameter		Between Dates Difference Fi,j	i	j	Significance	Between Stations Difference Fi,j	i	j	Significance
Filtered NH_3	s	13.4	6	9	S.D.	0.76	9	6	N.S.D.
	b	7.43	6	6	S.D.	1.59	6	6	N.S.D.
Chlorophyll a	s	9.52	7	9	S.D.	2.09	9	7	N.S.D.
Chlorophyll b	s	15.1	7	9	S.D.	1.31	9	7	N.S.D.
Total Fe	s	13.3	6	9	S.D.	2.87	9	6	N.S.D.
	b	7.96	6	6	S.D.	0.99	6	6	N.S.D.

Tested at 95% confidence level S.D. means significant difference
N.S.D. means no significant difference

s...sample from 1 m below surface
b...sample collected 1 m off bottom

TABLE 4

Long-Term Change of the Physico-Chemical Parameters, Nanticoke.1969-1976

Parameter	Average value			Average Change in % per year									Significance			Trend		
				Mean			Min			Max								
	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O
Conductivity uS/cm	312.9±1.3	313.3±1.3	312.0±1.2	-1.2	-1.2	-1.1	-1.0	-1.0	-1.0	-1.3	-1.3	-1.3	S	S	S	D	D	D
Chloride mg/l	23.3±0.3	23.3±0.3	23.3±0.2	-3.4	-3.3	-3.4	-2.8	2.7	-3.0	-3.9	-3.9	-3.9	S	S	S	D	D	D
Total P mg/l	0.0169±0.0008	0.0176±0.0010	0.0154±0.0008	-3.3	-2.5	-5.1	-1.2	0.0	-3.0	-5.5	-4.9	-7.3	S	NS	S	D	-	D
Dissolved P mg/l	0.0052±0.0006	0.0053±0.0006	0.0050±0.0005	-12.1	-9.7	-14.9	-7.4	-4.7	-10.5	-16.9	-14.7	-19.2	S	S	S	D	D	D
Total N mg N/l	0.395±0.015	0.406±0.015	0.376±0.015	0.9	1.6	0.1	-0.7	-0.1	-1.6	2.5	3.2	1.9	NS	NS	NS	-	-	-
Kjeldahl N mg N/l	0.296±0.010	0.305±0.010	0.284±0.011	-2.7	-2.3	-3.7	-1.2	-0.8	-2.0	-4.2	-3.7	-5.4	S	S	S	D	D	D
Ammonia mg N/l	0.028±0.005	0.026±0.003	0.026±0.003	-20.0	-17.7	-17.9	-12.6	-12.5	-12.3	-27.4	-22.9	-23.4	S	S	S	D	D	D
Nitrate + Nitrite mg N/l	0.099±0.010	0.102±0.010	0.095±0.010	14.4	14.4	15.3	10.1	10.1	19.91	18.8	18.7	10.7	S	S	S	I	I	I
Nitrate mg N/l	0.086±0.011	0.088±0.011	0.081±0.010	13.8	14.0	13.5	7.5	7.8	6.8	20.2	20.3	20.1	S	S	S	I	I	D
Nitrite mg N/l	0.004±0.0003	0.004±0.0003	0.004±0.0003	-2.0	-1.9	-1.5	1.6	1.7	2.3	-5.6	-5.4	-5.3	NS	NS	NS	-	-	-
pH	8.24±0.06	8.22±0.06	8.26±0.06	0.2	0.2	0.1	-0.2	-0.1	-0.2	0.5	0.5	0.5	NS	NS	NS	-	-	-
Phytoplankton crop ASU/ ml	345.6±35.2	363.0±37.4	314.6±35.6	-1.5	-1.3	-2.3	2.9	3.2	2.6	-5.9	-5.8	-7.2	NS	NS	NS	-	-	-
Chlorophyll a µg/l	2.55±0.26	2.34±0.21	2.04±0.19	-7.3	4.5	3.9	-2.2	-0.6	-1.4	-12.4	9.7	9.2	S	NS	NS	D	-	-
Dissolved Oxygen % Saturation	95.6±4.5	95.7±4.6	94.3±4.3	-0.7	-1.3	-0.5	0.2	-0.3	0.3	-1.6	-2.3	-1.4	NS	S	NS	-	D	-

Table 4 (cont'd)...

Parameter	Average value			Average Change in % per year									Significance			Trend		
				Mean			Min			Max								
	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O	ALL	N	O
Turbidity FTU	3.59±0.27	4.04±0.33	2.78±0.25	-8.3	-7.8	-12.9	-5.0	-4.2	-8.9	-11.5	-11.3	-16.8	S	S	S	D	D	D
Secchi disk depth m	2.90±0.18	2.22±0.16	3.99±0.29	-6.8	-5.7	-7.2	-3.7	-2.2	-3.5	-9.9	-9.2	-10.9	S	S	S	D	D	D
Temperature °C	14.8±0.8	14.8±0.8	14.6±0.8	-2.2	-1.8	-2.6	0.2	0.5	-0.1	-4.5	-4.1	-5.1	NS	NS	S	-	-	D
Water Level at Port Dover m	174.4±0.04	-	-	0.03	-	-	0.02	-	-	0.04	-	-	S	-	-	I	-	-

ALL...all sampling stations
N ...nearshore stations (518,810,994,1008,1016,1040)
O ...offshore stations (112,501,648)
S ...trend is significant
NS ...trend is not significant
I ...increase
D ...decrease

APPENDIX I

APPENDIX I, TABLE 1 , NANTICOKE 1976

WATER TEMPERATURE DEG. C

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	2.5	6.0	14.1	17.0	19.0	19.8	15.0	13.6	13.4	6.12
112	11.0	3.0	6.0	6.5	15.0	19.0	13.2	14.5	13.5	11.3	5.50
501	1.0	2.0	5.0	14.5	17.0	19.0	19.5	14.0	14.2	13.1	6.37
501	12.0	2.5	5.5	5.8	13.0	19.0	20.2	8.5	14.1	11.1	6.52
518	3.0	5.0	8.5	13.0	18.0	19.0	19.8	14.5	14.8	14.1	5.18
648	1.0	3.0	6.8	14.0	17.5	18.5	19.8	14.9	13.7	13.5	5.83
648	7.0	2.5	6.8	8.4	15.0	19.0	20.3	15.0	13.6	12.6	6.17
810	1.0	4.5	8.9	14.3	18.0	19.0	20.2	15.1	14.8	14.3	5.30
810	8.0	4.5	8.2	8.7	16.0	19.0	18.2	14.2	14.6	12.9	5.21
994	1.0	3.0	7.0	14.2	17.0	19.0	19.4	14.2	13.2	13.4	5.74
994	7.0	3.0	7.0	8.7	14.5	19.0	20.5	14.0	13.1	12.5	5.95
1016	1.0	4.0	7.6	13.9	18.0	19.5	15.0	11.8	13.2	12.9	5.12
1016	9.0	4.5	7.2	7.0	15.0	19.5	18.0	10.5	13.1	11.8	5.46
1040	3.0	6.5	8.5	12.6	16.5	19.5	20.0	10.8	14.6	13.6	4.93
1041	1.0	5.0	8.5	13.6	17.5	19.0	****	14.0	13.1	13.0	4.86
1041	9.0	5.0	8.0	7.0	15.0	19.5	****	14.0	13.0	11.6	5.15
1042	2.0	5.0	7.1	13.8	18.5	19.0	****	13.9	13.2	12.9	5.27
MEAN	SURFACE	4.0	7.4	13.8	17.5	19.0	19.2	13.8	13.8	13.4	5.20
	BOTTOM	3.6	7.0	7.4	14.8	19.1	18.4	13.0	13.6	12.0	5.45
ST DEV	SURFACE	1.40	1.26	0.59	0.62	0.28	1.71	1.42	0.70	12.8	5.33
	BOTTOM	1.06	0.98	1.16	0.91	0.24	2.77	2.46	0.59	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 2 , NANTICOKE 1976

BOD5 MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	1.0	0.8	0.6	0.4	0.4	0.1	0.6	****	0.6	0.29
112	11.0	0.6	0.6	1.2	0.6	0.4	0.3	0.6	****	0.6	0.29
501	1.0	1.0	0.8	1.6	0.4	0.4	0.1	0.6	****	0.7	0.49
501	12.0	1.0	0.8	0.8	0.4	0.4	0.4	0.4	****	0.6	0.26
518	3.0	0.6	0.4	0.8	0.6	0.4	0.2	0.6	****	0.5	0.20
648	1.0	0.6	0.6	0.6	0.4	0.4	0.3	0.6	****	0.5	0.13
648	7.0	1.0	1.0	1.0	0.6	0.6	0.1	0.8	****	0.7	0.33
810	1.0	0.6	0.8	0.4	0.4	0.4	0.1	0.4	****	0.4	0.21
810	8.0	1.0	0.4	1.6	0.6	0.4	0.4	0.6	****	0.7	0.45
994	1.0	0.8	0.6	0.4	0.2	0.6	0.1	0.4	****	0.4	0.24
994	7.0	0.8	0.8	1.4	1.0	0.6	0.1	0.4	****	0.7	0.42
1016	1.0	0.8	0.6	0.6	0.6	0.4	0.1	0.4	****	0.5	0.22
1016	9.0	0.8	0.4	1.4	0.6	0.4	****	0.6	****	0.7	0.37
1040	3.0	0.4	0.6	1.0	0.6	0.8	****	0.6	****	0.7	0.21
1041	1.0	1.0	0.6	0.6	0.4	0.4	0.2	0.8	****	0.6	0.27
1041	9.0	0.8	0.4	1.2	0.4	0.6	0.1	0.8	****	0.6	0.36
1042	2.0	0.8	0.4	1.0	0.8	0.4	0.1	0.6	****	0.6	0.31
MEAN	SURFACE	0.8	0.6	0.8	0.5	0.5	0.1	0.6	****	0.5	0.27
	BOTTOM	0.9	0.6	1.2	0.6	0.5	0.2	0.6	****	0.7	0.34
ST DEV	SURFACE	0.21	0.15	0.36	0.17	0.13	0.07	0.13	*****	0.6	0.30
	BOTTOM	0.15	0.24	0.27	0.20	0.11	0.15	0.16	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIx I, TABLE 3 , NANTICOKE 1976

CONDUCTIVITY AT 25 DEG.C UMHOS/CM

STATION	DEPTH M		APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0		295.	310.	297.	298.	299.	295.	305.	****	300.	5.61
112	11.0		295.	310.	300.	303.	299.	310.	305.	****	303.	5.64
501	1.0		295.	310.	300.	296.	299.	295.	305.	****	300.	5.66
501	12.0		295.	310.	300.	305.	305.	305.	310.	****	304.	5.35
518	3.0		295.	310.	297.	300.	300.	300.	305.	****	301.	5.03
648	1.0		295.	310.	295.	300.	300.	295.	300.	****	299.	5.35
648	7.0		295.	310.	295.	301.	299.	295.	300.	****	299.	5.38
810	1.0		295.	315.	297.	298.	300.	305.	305.	****	302.	6.84
810	8.0		295.	315.	300.	300.	300.	305.	305.	****	303.	6.36
994	1.0		295.	310.	300.	300.	300.	298.	305.	****	301.	4.91
994	7.0		295.	310.	300.	305.	303.	298.	305.	****	302.	5.02
1016	1.0		295.	305.	297.	300.	300.	302.	305.	****	301.	3.78
1016	9.0		295.	305.	300.	300.	300.	****	305.	****	301.	3.76
1040	3.0		300.	315.	295.	300.	300.	****	305.	****	303.	6.89
1041	1.0		300.	315.	295.	300.	300.	300.	305.	****	302.	6.36
1041	9.0		295.	310.	295.	300.	300.	308.	305.	****	302.	5.98
1042	2.0		295.	315.	295.	298.	304.	297.	305.	****	301.	7.27
MEAN	SURFACE		296.	312.	297.	299.	300.	299.	305.	****	301.	5.54
	BOTTOM		295.	310.	299.	302.	301.	304.	305.	****	302.	5.31
ST DEV	SURFACE		2.11	3.37	1.95	1.41	1.40	3.50	1.58	*****	301.	5.45
	BOTTOM		0.0	2.89	2.44	2.31	2.27	5.82	2.89	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 4 , NANTICOKE 1976

TURBIDITY (FORMAZIN UNITS)

STATION	DEPTH M		APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0		1.4	4.3	1.4	1.4	0.8	1.4	1.0	1.8	1.7	1.10
112	11.0		1.6	3.7	2.0	2.6	0.9	1.6	1.0	2.0	1.9	0.91
501	1.0		1.4	4.1	1.3	0.5	0.8	0.9	1.0	2.2	1.5	1.16
501	12.0		1.5	3.5	3.5	1.3	0.8	1.8	1.2	2.6	2.0	1.05
518	3.0		2.7	7.0	2.2	1.9	1.4	2.1	1.8	8.5	3.4	2.71
648	1.0		1.9	4.3	1.4	1.5	0.8	1.7	0.8	2.2	1.8	1.11
648	7.0		1.7	4.3	1.9	2.4	0.9	1.7	0.8	2.6	2.0	1.11
810	1.0		1.2	9.3	1.9	2.4	1.6	3.0	1.4	6.2	3.4	2.88
810	8.0		1.5	8.0	2.5	2.4	2.0	2.0	1.4	7.4	3.4	2.69
994	1.0		1.2	4.5	3.7	1.9	1.5	1.7	1.0	3.6	2.4	1.34
994	7.0		1.8	3.7	2.4	4.1	1.8	1.7	1.2	4.0	2.6	1.17
1016	1.0		1.3	3.6	2.2	2.6	1.5	2.2	1.6	4.0	2.4	0.98
1016	9.0		1.2	3.0	2.2	2.4	2.2	****	1.4	5.8	2.6	1.54
1040	3.0		2.6	8.0	2.5	2.6	1.5	****	2.8	9.0	4.1	3.02
1041	1.0		3.3	11.0	5.4	2.0	1.5	2.9	1.6	5.0	4.1	3.15
1041	9.0		2.5	5.5	2.9	2.4	1.8	2.7	2.6	7.2	3.4	1.87
1042	2.0		3.6	13.0	6.4	6.3	2.0	3.2	8.0	8.2	6.3	3.52
MEAN	SURFACE		2.1	6.9	2.8	2.3	1.3	2.1	2.1	5.1	3.1	2.59
	BOTTOM		1.7	4.5	2.5	2.5	1.5	1.9	1.4	4.5	2.6	1.61
ST DEV	SURFACE		0.92	3.32	1.77	1.54	0.41	0.77	2.15	2.76	2.9	2.25
	BOTTOM		0.41	1.72	0.56	0.82	0.60	0.41	0.58	2.28	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 5 , NANTICOKE 1976

PH AT LAB

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	8.40	8.28	8.06	8.49	8.45	8.68	8.35	****	8.39	0.192
112	11.0	8.30	8.26	8.10	8.20	8.47	7.87	8.37	****	8.22	0.196
501	1.0	8.30	8.24	8.63	8.59	8.47	8.50	8.32	****	8.44	0.151
501	12.0	8.30	8.26	8.11	8.09	8.28	8.15	7.86	****	8.15	0.153
518	3.0	8.40	8.30	8.56	8.52	8.41	8.45	8.32	****	8.42	0.096
648	1.0	8.40	8.27	8.68	8.55	8.47	8.39	8.37	****	8.45	0.134
648	7.0	8.30	8.28	8.26	8.38	8.51	8.54	8.37	****	8.38	0.111
810	1.0	8.40	8.32	8.59	8.54	8.33	8.28	8.31	****	8.40	0.122
810	8.0	8.40	8.30	8.27	8.46	8.33	8.15	8.34	****	8.32	0.099
994	1.0	8.40	8.29	8.59	8.41	8.38	8.45	8.27	****	8.40	0.107
994	7.0	8.40	8.33	8.21	8.27	8.14	8.44	8.30	****	8.30	0.104
1016	1.0	8.40	8.35	8.55	8.61	8.38	8.44	8.31	****	8.43	0.109
1016	9.0	8.40	8.36	8.09	8.40	8.40	****	8.29	****	8.32	0.122
1040	3.0	8.40	8.28	8.55	8.40	8.34	****	8.31	****	8.38	0.096
1041	1.0	8.40	8.13	8.56	8.56	8.35	8.45	8.33	****	8.40	0.149
1041	9.0	8.40	8.32	8.06	8.42	8.40	8.15	8.33	****	8.30	0.139
1042	2.0	8.40	8.30	8.55	8.44	8.20	8.74	8.33	****	8.42	0.179
MEAN	SURFACE	8.39	8.28	8.53	8.51	8.38	8.49	8.32	****	8.41	0.134
	BOTTOM	8.36	8.30	8.16	8.32	8.36	8.22	8.27	****	8.28	0.148
ST DEV	SURFACE	0.031	0.060	0.171	0.074	0.082	0.141	0.027	*****	8.36	0.153
	BOTTOM	0.053	0.038	0.087	0.135	0.125	0.240	0.182	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 6 , NANTICOKE 1976

CHLORIDE MG/L

STATION	DEPTH M		APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0		20.5	20.0	21.0	21.0	21.0	21.5	21.0	****	20.9	0.48
112	11.0		20.5	20.0	21.0	21.0	21.0	21.5	21.0	****	20.9	0.48
501	1.0		20.5	20.5	20.5	21.0	21.0	22.0	21.0	****	20.9	0.53
501	12.0		20.5	20.0	21.0	21.0	21.0	21.5	21.5	****	20.9	0.53
518	3.0		20.5	20.0	21.0	21.0	21.0	21.5	21.0	****	20.9	0.48
648	1.0		20.0	20.0	21.0	21.0	21.0	21.5	21.0	****	20.8	0.57
648	7.0		20.0	20.0	21.0	21.0	21.0	21.5	21.0	****	20.8	0.57
810	1.0		20.5	19.5	21.0	21.0	21.0	21.5	21.0	****	20.8	0.64
810	8.0		20.5	20.0	21.0	21.0	21.0	21.5	21.0	****	20.9	0.48
994	1.0		20.5	20.0	21.0	21.0	21.0	21.5	21.0	****	20.9	0.48
994	7.0		20.5	20.0	20.5	21.0	20.5	21.5	21.0	****	20.7	0.49
1016	1.0		20.5	20.0	21.0	21.5	21.0	21.5	21.0	****	20.9	0.53
1016	9.0		20.5	20.0	21.0	21.0	21.0	21.5	21.5	****	20.9	0.53
1040	3.0		20.5	20.0	20.5	21.0	21.0	21.5	21.0	****	20.8	0.49
1041	1.0		20.0	19.5	21.0	21.0	21.0	21.5	21.5	****	20.8	0.76
1041	9.0		20.0	20.0	21.0	21.0	21.0	21.5	21.5	****	20.9	0.63
1042	2.0		20.0	19.0	21.0	21.5	21.0	21.5	21.5	****	20.8	0.95
MEAN	SURFACE		20.3	19.8	20.9	21.1	21.0	21.5	21.1	****	20.8	0.57
	BOTTOM		20.4	20.0	20.9	21.0	20.9	21.5	21.2	****	20.8	0.50
ST DEV	SURFACE		0.24	0.41	0.21	0.21	0.0	0.16	0.21	*****	20.8	0.54
	BOTTOM		0.24	0.0	0.19	0.0	0.19	0.0	0.27	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIx I, TABLE 7 , NANTICOKE 1976

SULPHATE MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	28.5	25.0	25.0	25.0	25.0	24.0	24.5	****	25.3	1.47
112	11.0	28.5	24.5	25.0	25.0	25.0	24.0	24.5	****	25.2	1.50
501	1.0	28.5	24.5	25.0	25.0	25.0	24.0	24.5	****	25.2	1.50
501	12.0	28.5	24.5	25.0	25.0	25.0	24.0	24.5	****	25.2	1.50
518	3.0	30.0	25.0	25.0	25.0	25.0	24.0	25.0	****	25.6	1.99
648	1.0	28.5	24.5	25.0	25.0	25.0	24.0	24.5	****	25.2	1.50
648	7.0	28.5	24.5	25.0	25.0	25.0	24.0	24.5	****	25.2	1.50
810	1.0	29.0	25.5	25.0	25.0	25.0	24.0	24.5	****	25.4	1.64
810	8.0	29.0	25.0	24.0	25.0	25.0	24.0	24.0	****	25.1	1.77
994	1.0	28.5	25.0	25.0	25.0	25.0	24.0	24.5	****	25.3	1.47
994	7.0	29.0	25.0	24.0	25.0	25.0	24.0	24.5	****	25.2	1.73
1016	1.0	29.0	24.0	25.0	25.0	25.0	24.0	24.0	****	25.1	1.77
1016	9.0	29.5	24.0	24.0	25.0	25.0	24.0	25.0	****	25.2	1.95
1040	3.0	31.5	25.0	25.0	25.0	25.0	24.0	24.5	****	25.7	2.58
1041	1.0	30.5	25.0	25.0	25.0	25.0	24.0	25.5	****	25.7	2.16
1041	9.0	30.0	25.5	24.0	25.0	25.0	24.0	25.0	****	25.5	2.06
1042	2.0	30.0	25.0	25.0	27.0	25.0	24.0	24.5	****	25.8	2.08
MEAN	SURFACE	29.4	24.8	25.0	25.2	25.0	24.0	24.6	****	25.4	1.74
	BOTTOM	29.0	24.7	24.4	25.0	25.0	24.0	24.6	****	25.2	1.62
ST DEV	SURFACE	1.05	0.41	0.0	0.63	0.0	0.0	0.39	*****	25.4	1.69
	BOTTOM	0.58	0.49	0.53	0.0	0.0	0.0	0.35	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIx I, TABLE 8 , NANTICOKE 1976

SUSPENDED SOLIDS MG/L

STATTON	DEPTH M		APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0		2.0	****	2.0	1.0	1.0	2.0	2.0	****	1.7	0.52
112	11.0		3.0	****	2.0	2.0	1.0	3.0	2.0	****	2.2	0.75
501	1.0		2.0	****	1.0	1.0	1.0	2.0	2.0	****	1.5	0.55
501	12.0		3.0	****	4.0	3.0	2.0	3.0	6.0	****	3.5	1.38
518	3.0		5.0	****	2.0	1.0	2.0	3.0	6.0	****	3.2	1.94
648	1.0		2.0	****	1.0	1.0	1.0	2.0	2.0	****	1.5	0.55
648	7.0		3.0	****	4.0	2.0	1.0	3.0	2.0	****	2.5	1.05
810	1.0		2.0	****	2.0	2.0	2.0	5.0	5.0	****	3.0	1.55
810	8.0		3.0	****	3.0	2.0	3.0	2.0	3.0	****	2.7	0.52
994	1.0		2.0	****	4.0	1.0	2.0	2.0	2.0	****	2.2	0.98
994	7.0		5.0	****	3.0	3.0	2.0	2.0	2.0	****	2.8	1.17
1016	1.0		2.0	****	2.0	1.0	1.0	3.0	3.0	****	2.0	0.89
1016	9.0		2.0	****	3.0	2.0	2.0	****	3.0	****	2.4	0.55
1040	3.0		6.0	****	3.0	1.0	2.0	****	7.0	****	3.8	2.59
1041	1.0		6.0	****	6.0	1.0	1.0	4.0	4.0	****	3.7	2.25
1041	9.0		4.0	****	4.0	2.0	2.0	4.0	4.0	****	3.3	1.03
1042	2.0		6.0	****	9.0	8.0	3.0	5.0	11.0	****	7.0	2.90
MEAN	SURFACE		3.5	****	3.2	1.8	1.6	3.1	4.4	****	2.9	2.23
	BOTTOM		3.3	****	3.3	2.3	1.9	2.8	3.1	****	2.8	1.01
ST DEV	SURFACE		1.96	*****	2.53	2.20	0.70	1.27	2.95	*****	2.9	1.82
	BOTTOM		0.95	*****	0.76	0.49	0.69	0.75	1.46	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 9 , NANTICOKE 1976

TOTAL ALKALINITY AT LAB MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	960.	950.	960.	960.	960.	920.	940.	****	950.	15.28
112	11.0	950.	950.	960.	960.	950.	930.	940.	****	949.	10.69
501	1.0	940.	950.	940.	950.	950.	920.	940.	****	941.	10.70
501	12.0	950.	940.	940.	970.	950.	950.	960.	****	951.	10.69
518	3.0	950.	****	950.	960.	960.	920.	940.	****	947.	15.06
648	1.0	940.	****	950.	960.	940.	920.	940.	****	942.	13.30
648	7.0	940.	****	950.	980.	950.	960.	940.	****	953.	15.06
810	1.0	940.	****	960.	960.	960.	960.	970.	****	958.	9.84
810	8.0	960.	990.	950.	960.	960.	970.	950.	****	963.	13.80
994	1.0	940.	****	950.	960.	960.	910.	950.	****	945.	18.71
994	7.0	960.	970.	940.	970.	970.	920.	950.	****	954.	19.03
1016	1.0	960.	950.	950.	970.	960.	950.	960.	****	957.	7.56
1016	9.0	970.	950.	950.	960.	960.	****	960.	****	958.	7.54
1040	3.0	980.	980.	950.	960.	960.	****	960.	****	965.	12.26
1041	1.0	980.	970.	950.	960.	960.	940.	980.	****	963.	14.96
1041	9.0	****	960.	940.	970.	960.	920.	980.	****	963.	28.70
1042	2.0	990.	****	950.	940.	970.	920.	970.	****	966.	33.10
MEAN	SURFACE	958.	970.	951.	958.	958.	929.	955.	****	954.	17.95
	BOTTOM	963.	960.	947.	967.	957.	942.	954.	****	956.	16.33
ST DEV	SURFACE	19.32	27.57	5.69	7.89	7.89	16.92	15.10	*****	955.	17.27
	BOTTOM	22.89	17.89	7.57	7.57	7.56	21.37	13.98	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 10 , NANTICOKE 1976

REACTIVE SILICATE AS SI MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.05	0.05	0.05	0.10	0.15	0.10	0.10	****	0.09	0.038
112	11.0	0.05	0.05	0.05	0.10	0.15	0.40	0.10	****	0.13	0.125
501	1.0	0.05	0.05	0.05	0.05	0.15	0.10	0.10	****	0.08	0.039
501	12.0	0.05	0.15	0.05	0.10	0.15	0.25	0.35	****	0.16	0.110
518	3.0	0.05	0.05	0.05	0.10	0.15	0.15	0.10	****	0.09	0.045
648	1.0	0.05	0.05	0.05	0.10	0.15	0.10	0.10	****	0.09	0.038
648	7.0	0.05	0.05	0.05	0.10	0.15	0.10	0.10	****	0.09	0.038
810	1.0	0.05	0.05	0.05	0.10	0.15	0.20	0.15	****	0.11	0.061
810	8.0	0.05	0.05	0.05	0.10	0.15	0.25	0.15	****	0.11	0.075
994	1.0	0.05	0.05	0.05	0.10	0.15	0.10	0.10	****	0.09	0.038
994	7.0	0.05	0.15	0.05	0.10	0.15	0.15	0.10	****	0.11	0.045
1016	1.0	0.05	0.20	0.05	0.10	0.15	0.15	0.20	****	0.13	0.064
1016	9.0	0.05	0.15	0.05	0.10	0.15	0.35	0.20	****	0.15	0.104
1040	3.0	0.05	0.25	0.05	0.10	0.15	0.20	0.15	****	0.14	0.075
1041	1.0	0.05	0.25	0.05	0.10	0.15	0.15	0.20	****	0.14	0.075
1041	9.0	0.05	0.05	0.05	0.10	0.15	0.30	0.25	****	0.14	0.103
1042	2.0	0.05	0.15	0.05	0.05	0.15	0.15	0.20	****	0.11	0.063
MEAN	SURFACE	0.05	0.11	0.05	0.09	0.15	0.14	0.14	****	0.10	0.056
	BOTTOM	0.05	0.09	0.05	0.10	0.15	0.26	0.18	****	0.13	0.088
ST DEV	SURFACE	0.000	0.088	0.000	0.021	0.000	0.039	0.046	*****	0.11	0.072
	BOTTOM	0.000	0.053	0.000	0.0	0.000	0.106	0.095	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 11 , NANTICOKE 1976

SECCHI DISK DEPTH M

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	1.5	1.5	2.8	3.7	6.9	4.0	5.2	2.5	3.3	1.73
112	11.0	****	****	****	****	****	****	****	****	****	*****
501	1.0	1.6	1.5	3.0	8.0	6.5	5.0	3.1	2.4	3.9	2.38
501	12.0	****	****	****	****	****	****	****	****	****	*****
518	3.0	0.9	0.9	1.0	2.7	4.9	2.8	1.7	0.8	2.0	1.44
648	1.0	1.3	1.2	2.8	4.0	6.9	3.5	3.1	2.3	3.1	1.81
648	7.0	****	****	****	****	****	****	****	****	****	*****
810	1.0	1.7	0.8	1.8	2.1	4.3	1.5	1.4	1.2	1.8	1.07
810	8.0	****	****	****	****	****	****	****	****	****	*****
994	1.0	1.9	1.7	1.5	3.3	4.1	3.0	3.1	1.6	2.5	0.97
994	7.0	****	****	****	****	****	****	****	****	****	*****
1016	1.0	1.7	1.5	1.8	2.0	5.1	2.0	2.5	1.6	2.3	1.18
1016	9.0	****	****	****	****	****	****	****	****	****	*****
1040	3.0	0.7	0.8	1.5	2.0	4.2	2.3	1.5	0.8	1.7	1.16
1041	1.0	0.7	0.7	1.0	3.4	5.7	2.0	1.9	1.3	2.1	1.71
1041	9.0	****	****	****	****	****	****	****	****	****	*****
1042	2.0	0.8	0.7	0.8	0.7	4.0	1.5	0.9	0.8	1.3	1.13
MEAN SURFACE		1.3	1.1	1.8	3.2	5.3	2.8	2.2	1.5	2.4	1.62
MEAN BOTTOM		****	****	****	****	****	****	****	****	****	*****
ST DEV SURFACE		0.46	0.39	0.81	1.96	1.17	1.14	0.86	0.67	2.4	1.62
ST DEV BOTTOM		*****	*****	*****	*****	*****	*****	*****	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 12 , NANTICOKE 1976

DISSOLVED OXYGEN MG/L

STATION	DEPTH M		APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0		12.6	12.6	10.9	11.0	8.6	7.8	8.5	****	10.3	1.98
112	11.0		12.8	12.6	9.4	9.2	8.0	3.9	8.8	****	9.2	2.99
501	1.0		12.4	12.4	10.5	10.8	8.6	8.1	9.3	****	10.3	1.71
501	12.0		12.8	12.6	10.1	6.5	8.4	7.9	6.3	****	9.2	2.69
518	3.0		12.4	11.9	10.8	10.8	8.3	7.0	9.2	****	10.1	1.96
648	1.0		12.4	12.2	11.0	11.2	8.7	7.6	9.3	****	10.3	1.83
648	7.0		12.6	12.2	10.2	8.8	8.5	7.4	9.3	****	9.9	1.93
810	1.0		12.2	11.7	10.8	11.0	8.3	6.3	9.3	****	9.9	2.10
810	8.0		12.6	11.7	10.2	10.4	8.2	5.6	9.2	****	9.7	2.33
994	1.0		12.6	12.3	10.4	10.4	8.3	7.0	9.4	****	10.1	2.01
994	7.0		12.5	12.0	10.0	9.4	8.2	7.3	9.6	****	9.9	1.88
1016	1.0		12.2	12.1	10.8	10.8	8.4	7.4	9.2	****	10.1	1.84
1016	9.0		12.6	12.2	9.8	9.0	8.3	5.1	9.2	****	9.5	2.52
1040	3.0		12.2	11.8	10.8	11.2	8.4	6.5	9.4	****	10.0	2.04
1041	1.0		12.1	11.6	10.6	10.9	8.5	****	9.2	****	10.5	1.39
1041	9.0		12.4	11.8	9.5	9.4	8.4	****	9.3	****	10.1	1.58
1042	2.0		12.0	11.4	10.5	11.2	8.6	****	9.2	****	10.5	1.33
MEAN	SURFACE		12.3	12.0	10.7	10.9	8.5	7.2	9.2	****	10.2	1.73
	BOTTOM		12.6	12.2	9.9	9.0	8.3	6.2	8.8	****	9.6	2.20
ST DEV	SURFACE		0.20	0.38	0.20	0.25	0.15	0.63	0.26	*****	10.0	1.95
	BOTTOM		0.15	0.36	0.33	1.20	0.17	1.56	1.13	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 13 , NANTICOKE 1976

DISSOLVED OXYGEN % SATURATION

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	92.	101.	105.	113.	92.	85.	84.	****	96.	10.74
112	11.0	95.	101.	76.	91.	86.	37.	86.	****	82.	21.23
501	1.0	90.	97.	102.	111.	92.	88.	90.	****	96.	8.30
501	12.0	94.	100.	81.	61.	90.	87.	54.	****	81.	17.20
518	3.0	97.	101.	102.	113.	89.	76.	90.	****	95.	11.79
648	1.0	92.	100.	106.	116.	92.	83.	91.	****	97.	11.05
648	7.0	92.	100.	87.	87.	91.	81.	92.	****	90.	5.89
810	1.0	94.	101.	105.	115.	89.	69.	92.	****	95.	14.48
810	8.0	97.	99.	87.	105.	88.	59.	89.	****	89.	14.86
994	1.0	93.	101.	101.	107.	89.	76.	91.	****	94.	10.21
994	7.0	93.	99.	86.	91.	88.	80.	93.	****	90.	6.06
1016	1.0	93.	101.	104.	113.	91.	73.	85.	****	94.	13.17
1016	9.0	97.	101.	81.	89.	90.	53.	82.	****	85.	15.76
1040	3.0	99.	101.	101.	114.	91.	71.	84.	****	94.	13.90
1041	1.0	95.	99.	101.	113.	91.	****	89.	****	98.	8.65
1041	9.0	97.	99.	78.	93.	91.	****	90.	****	91.	7.39
1042	2.0	94.	99.	101.	119.	92.	****	89.	****	99.	10.75
MEAN	SURFACE	94.	100.	103.	113.	91.	78.	89.	****	96.	10.84
	BOTTOM	95.	100.	82.	88.	89.	66.	84.	****	87.	13.64
ST DEV	SURFACE	2.60	1.37	1.99	3.13	1.32	6.93	3.03	*****	92.	12.83
	BOTTOM	2.08	0.90	4.46	13.31	1.86	19.60	13.62	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 14 , NANTICOKE 1976

TOTAL PHOSPHORUS MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.015	0.006	0.007	0.014	0.010	0.006	0.009	0.007	0.009	0.0035
112	11.0	0.012	0.011	0.013	0.013	0.014	0.007	0.003	0.002	0.009	0.0047
501	1.0	0.012	0.006	0.014	0.007	0.011	0.028	0.005	0.009	0.011	0.0073
501	12.0	0.016	0.012	0.011	0.022	0.010	0.010	0.009	0.008	0.012	0.0046
518	3.0	0.015	0.010	0.009	0.015	0.011	0.010	0.009	0.011	0.011	0.0024
648	1.0	0.012	0.006	0.007	0.012	0.009	0.011	0.008	0.006	0.009	0.0025
648	7.0	0.010	0.007	0.011	0.011	0.012	0.009	0.008	0.003	0.009	0.0029
810	1.0	0.012	0.015	0.016	0.020	0.013	0.009	0.010	0.008	0.013	0.0040
810	8.0	0.018	0.021	0.015	0.016	0.013	0.008	0.018	0.005	0.014	0.0054
994	1.0	0.009	0.010	0.025	0.013	0.036	0.008	0.009	0.007	0.015	0.0104
994	7.0	0.009	0.018	0.018	0.010	0.014	0.014	0.011	0.008	0.013	0.0039
1016	1.0	0.012	0.010	0.010	0.016	0.010	0.003	0.009	0.010	0.010	0.0036
1016	9.0	0.023	0.013	0.015	0.012	0.014	0.003	0.011	0.058	0.019	0.0168
1040	3.0	0.015	0.018	0.013	0.013	0.012	0.008	0.012	0.010	0.013	0.0030
1041	1.0	0.012	0.016	0.014	0.029	0.011	0.006	0.008	0.009	0.013	0.0072
1041	9.0	0.013	0.014	0.020	0.012	0.017	0.012	0.006	0.010	0.013	0.0042
1042	2.0	0.018	0.018	0.015	0.024	0.013	0.015	0.015	0.014	0.016	0.0035
MEAN SURFACE		0.013	0.011	0.013	0.016	0.014	0.010	0.009	0.009	0.012	0.0055
MEAN BOTTOM		0.014	0.014	0.015	0.014	0.013	0.009	0.009	0.013	0.013	0.0077
ST DEV SURFACE		0.0025	0.0049	0.0053	0.0064	0.0080	0.0070	0.0026	0.0023	0.012	0.0065
ST DEV BOTTOM		0.0049	0.0046	0.0034	0.0041	0.0021	0.0036	0.0047	0.0199	*****	******

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 15 , NANTICOKE 1976

FILTERED REACTIVE PHOSPHORUS MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.004	0.004	0.002	0.005	0.001	0.002	0.001	*****	0.003	0.0016
112	11.0	0.004	0.004	0.004	0.004	0.003	0.004	0.002	*****	0.004	0.0008
501	1.0	0.004	0.004	0.004	0.003	0.003	0.022	0.002	*****	0.006	0.0071
501	12.0	0.004	0.004	0.004	0.011	0.002	0.007	0.003	*****	0.005	0.0031
518	3.0	0.004	0.004	0.003	0.006	0.002	0.001	0.002	*****	0.003	0.0017
648	1.0	0.004	0.003	0.003	0.004	0.001	0.003	0.002	*****	0.003	0.0011
648	7.0	0.004	0.003	0.003	0.006	0.002	0.002	0.002	*****	0.003	0.0015
810	1.0	0.002	0.004	0.007	0.005	0.001	0.002	0.003	*****	0.003	0.0021
810	8.0	0.004	0.004	0.004	0.005	0.002	0.003	0.002	*****	0.003	0.0011
994	1.0	0.003	0.004	0.016	0.003	0.014	0.005	0.003	*****	0.007	0.0056
994	7.0	0.003	0.005	0.005	0.003	0.004	0.009	0.004	*****	0.005	0.0021
1016	1.0	0.002	0.003	0.003	0.005	0.001	0.001	0.003	*****	0.003	0.0014
1016	9.0	0.003	0.003	0.004	0.004	0.005	0.003	0.003	*****	0.004	0.0008
1040	3.0	0.004	0.003	0.003	0.003	0.002	0.004	0.003	*****	0.003	0.0007
1041	1.0	0.002	0.003	0.003	0.019	0.002	0.002	0.003	*****	0.005	0.0063
1041	9.0	0.003	0.003	0.005	0.004	0.002	0.003	0.004	*****	0.003	0.0010
1042	2.0	0.003	0.003	0.003	0.006	0.003	0.004	0.003	*****	0.004	0.0011
MEAN	SURFACE	0.003	0.003	0.005	0.006	0.003	0.005	0.002	*****	0.004	0.0037
	BOTTOM	0.004	0.004	0.004	0.005	0.003	0.004	0.003	*****	0.004	0.0017
ST DEV	SURFACE	0.0009	0.0005	0.0042	0.0047	0.0039	0.0063	0.0007	******	0.004	0.0030
	BOTTOM	0.0005	0.0008	0.0007	0.0027	0.0012	0.0026	0.0009	******	*****	******

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 16 , NANTICOKE 1976

TOTAL KJELDAHL NITROGEN MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.330	0.100	0.245	0.300	0.245	0.190	0.225	*****	0.234	0.0750
112	11.0	0.240	0.205	0.290	0.245	0.235	0.205	0.165	*****	0.226	0.0394
501	1.0	0.260	0.160	0.285	0.210	0.395	0.425	0.195	*****	0.276	0.1009
501	12.0	0.310	0.165	0.255	0.340	0.245	0.200	0.205	*****	0.246	0.0624
518	3.0	0.290	0.205	0.305	0.265	0.235	0.210	0.200	*****	0.244	0.0428
648	1.0	0.285	0.145	0.255	0.285	0.220	0.240	0.215	*****	0.235	0.0486
648	7.0	0.230	0.155	0.280	0.230	0.230	0.290	0.215	*****	0.233	0.0445
810	1.0	0.280	0.265	0.235	0.300	0.245	0.220	0.195	*****	0.249	0.0360
810	8.0	0.315	0.330	0.320	0.260	0.240	0.340	0.245	*****	0.293	0.0428
994	1.0	0.230	0.250	0.245	0.280	0.630	0.185	0.220	*****	0.291	0.1521
994	7.0	0.265	0.270	0.340	0.230	0.260	0.275	0.315	*****	0.279	0.0367
1016	1.0	0.265	0.285	0.295	0.480	0.300	0.075	0.250	*****	0.279	0.1182
1016	9.0	0.330	0.290	0.335	0.215	0.255	0.100	0.235	*****	0.251	0.0808
1040	3.0	0.330	0.325	0.295	0.255	0.225	0.230	0.250	*****	0.273	0.0437
1041	1.0	0.305	0.285	0.280	0.320	0.245	0.215	0.240	*****	0.270	0.0379
1041	9.0	0.260	0.290	0.405	0.220	0.240	0.260	0.210	*****	0.269	0.0656
1042	2.0	0.280	0.300	0.275	0.305	0.245	0.195	0.235	*****	0.262	0.0394
MEAN	SURFACE	0.285	0.232	0.271	0.300	0.298	0.218	0.222	*****	0.261	0.0766
	BOTTOM	0.279	0.244	0.318	0.249	0.244	0.239	0.227	*****	0.257	0.0566
ST DEV	SURFACE	0.0309	0.0754	0.0247	0.0706	0.1275	0.0859	0.0212	******	0.259	0.0688
	BOTTOM	0.0394	0.0683	0.0492	0.0431	0.0107	0.0780	0.0464	******	*****	******

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 17 , NANTICOKE 1976

FILTERED NO2+NO3 MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.205	0.265	0.110	0.170	0.120	0.050	0.115	*****	0.148	0.0711
112	11.0	0.195	0.255	0.215	0.190	0.145	0.275	0.120	*****	0.199	0.0554
501	1.0	0.195	0.240	0.125	0.143	0.150	0.095	0.110	*****	0.151	0.0507
501	12.0	0.205	0.220	0.210	0.210	0.140	0.190	0.300	*****	0.211	0.0475
518	3.0	0.210	0.270	0.125	0.165	0.130	0.085	0.140	*****	0.161	0.0616
648	1.0	0.205	0.255	0.110	0.160	0.130	0.055	0.115	*****	0.147	0.0663
648	7.0	0.200	0.260	0.160	0.185	0.135	0.055	0.115	*****	0.159	0.0657
810	1.0	0.195	0.305	0.140	0.170	0.145	0.115	0.135	*****	0.172	0.0640
810	8.0	0.200	0.265	0.170	0.180	0.145	0.135	0.135	*****	0.176	0.0463
994	1.0	0.195	0.210	0.125	0.200	0.200	0.055	0.120	*****	0.158	0.0588
994	7.0	0.195	0.200	0.160	0.220	0.170	0.070	0.125	*****	0.163	0.0513
1016	1.0	0.205	0.200	0.150	0.200	0.120	0.075	0.135	*****	0.155	0.0493
1016	9.0	0.205	0.195	0.210	0.185	0.140	0.200	0.120	*****	0.179	0.0351
1040	3.0	0.225	0.260	0.140	0.180	0.135	0.095	0.135	*****	0.167	0.0579
1041	1.0	0.230	0.260	0.120	0.195	0.135	0.070	0.135	*****	0.164	0.0671
1041	9.0	0.215	0.210	0.210	0.180	0.150	0.175	0.135	*****	0.182	0.0315
1042	2.0	0.235	0.285	0.130	0.140	0.140	0.055	0.125	*****	0.159	0.0766
MEAN	SURFACE	0.210	0.255	0.127	0.172	0.140	0.075	0.126	*****	0.158	0.0591
	BOTTOM	0.202	0.229	0.191	0.193	0.146	0.157	0.150	*****	0.181	0.0488
ST DEV	SURFACE	0.0149	0.0317	0.0130	0.0217	0.0230	0.0220	0.0108	******	0.168	0.0561
	BOTTOM	0.0070	0.0299	0.0259	0.0158	0.0114	0.0771	0.0666	******	*****	******

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 18 , NANTICOKE 1976

FILTERED AMMONIA MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.020	0.016	0.006	0.018	0.006	0.002	0.004	*****	0.010	0.0074
112	11.0	0.018	0.008	0.014	0.018	0.008	0.004	0.006	*****	0.011	0.0058
501	1.0	0.032	0.014	0.010	0.012	0.008	0.008	0.002	*****	0.012	0.0095
501	12.0	0.022	0.006	0.036	0.028	0.008	0.002	0.004	*****	0.015	0.0134
518	3.0	0.014	0.020	0.014	0.016	0.004	0.004	0.006	*****	0.011	0.0064
648	1.0	0.028	0.014	0.012	0.014	0.004	0.002	0.006	*****	0.011	0.0088
648	7.0	0.024	0.008	0.014	0.014	0.006	0.014	0.004	*****	0.012	0.0067
810	1.0	0.026	0.012	0.010	0.014	0.008	0.008	0.008	*****	0.012	0.0065
810	8.0	0.014	0.010	0.010	0.006	0.008	0.008	0.006	*****	0.009	0.0028
994	1.0	0.016	0.020	0.010	0.006	0.018	0.002	0.008	*****	0.011	0.0067
994	7.0	0.018	0.010	0.010	0.020	0.006	0.004	0.014	*****	0.012	0.0059
1016	1.0	0.016	0.008	0.008	0.016	0.008	0.002	0.006	*****	0.009	0.0051
1016	9.0	0.018	0.006	0.012	0.004	0.006	0.008	0.004	*****	0.008	0.0051
1040	3.0	0.024	0.004	0.004	0.006	0.004	0.008	0.010	*****	0.009	0.0072
1041	1.0	0.012	0.008	0.010	0.014	0.008	0.004	0.008	*****	0.009	0.0032
1041	9.0	0.016	0.004	0.014	0.012	0.008	0.002	0.004	*****	0.009	0.0055
1042	2.0	0.014	0.010	0.008	0.006	0.006	0.004	0.012	*****	0.009	0.0036
MEAN	SURFACE	0.020	0.013	0.009	0.012	0.007	0.004	0.007	*****	0.010	0.0064
	BOTTOM	0.019	0.007	0.016	0.015	0.007	0.006	0.006	*****	0.011	0.0071
ST DEV	SURFACE	0.0069	0.0053	0.0029	0.0046	0.0041	0.0026	0.0029	******	0.011	0.0067
	BOTTOM	0.0034	0.0022	0.0091	0.0083	0.0011	0.0043	0.0037	******	*****	******

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 19 , NANTICOKE 1976

CHLOROPHYLL A UG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	2.1	2.5	3.1	2.2	1.2	2.6	4.2	2.6	2.6	0.86
112	11.0	****	****	****	****	****	****	****	****	****	*****
501	1.0	2.2	2.0	3.0	1.5	1.4	2.1	3.6	3.8	2.4	0.91
501	12.0	****	****	****	****	****	****	****	****	****	*****
518	3.0	3.3	3.0	3.0	3.9	1.4	3.5	3.0	3.2	3.0	0.73
648	1.0	2.0	3.0	3.4	2.8	1.8	2.5	3.9	1.9	2.7	0.76
648	7.0	****	****	****	****	****	****	****	****	****	*****
810	1.0	3.6	3.0	3.1	2.9	1.5	****	3.0	2.3	2.8	0.66
810	8.0	****	****	****	****	****	****	****	****	****	*****
994	1.0	2.4	2.5	3.4	1.7	1.4	3.2	2.8	2.4	2.5	0.68
994	7.0	****	****	****	****	****	****	****	****	****	*****
1016	1.0	2.6	3.0	3.6	4.3	1.4	3.8	2.9	2.0	2.9	0.96
1016	9.0	****	****	****	****	****	****	****	****	****	*****
1040	3.0	4.0	3.0	3.1	4.2	1.4	****	3.0	2.3	3.0	0.96
1041	1.0	3.6	3.0	3.7	2.5	1.6	3.9	3.8	2.3	3.0	0.84
1041	9.0	****	****	****	****	****	****	****	****	****	*****
1042	2.0	3.5	3.5	3.6	5.7	1.6	4.1	3.3	2.6	3.5	1.18
MEAN	SURFACE	2.9	2.8	3.3	3.2	1.5	3.2	3.3	2.5	2.8	0.87
	BOTTOM	****	****	****	****	****	****	****	****	****	*****
ST DEV	SURFACE	0.74	0.41	0.27	1.33	0.16	0.74	0.49	0.57	2.8	0.87
	BOTTOM	*****	*****	*****	*****	*****	*****	*****	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIx I, TABLE 20 , NANTICOKE 1976

CHLOROPHYLL B UG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.2	0.4	0.6	0.6	0.5	0.7	0.9	0.9	0.6	0.24
112	11.0	****	****	****	****	****	****	****	****	****	*****
501	1.0	0.4	0.5	0.8	1.0	0.5	0.8	0.6	0.8	0.7	0.21
501	12.0	****	****	****	****	****	****	****	****	****	*****
518	3.0	0.3	0.4	0.7	1.0	0.6	0.8	0.7	1.2	0.7	0.29
648	1.0	0.3	0.4	0.9	0.5	0.4	0.7	0.6	0.7	0.6	0.20
648	7.0	****	****	****	****	****	****	****	****	****	*****
810	1.0	0.3	0.5	0.9	0.4	0.7	****	0.6	0.7	0.6	0.20
810	8.0	****	****	****	****	****	****	****	****	****	*****
994	1.0	0.3	0.7	1.2	0.4	0.5	0.8	0.6	0.8	0.7	0.28
994	7.0	****	****	****	****	****	****	****	****	****	*****
1016	1.0	0.4	0.3	0.9	0.7	0.6	1.0	0.8	0.8	0.7	0.24
1016	9.0	****	****	****	****	****	****	****	****	****	*****
1040	3.0	0.6	0.5	1.0	0.7	0.3	****	0.5	0.9	0.6	0.24
1041	1.0	0.6	0.5	1.0	0.5	0.5	0.8	0.7	1.0	0.7	0.21
1041	9.0	****	****	****	****	****	****	****	****	****	*****
1042	2.0	0.8	0.5	1.2	0.7	0.5	0.7	0.6	1.2	0.8	0.28
MEAN	SURFACE	0.4	0.5	0.9	0.6	0.5	0.8	0.7	0.9	0.7	0.24
	BOTTOM	****	****	****	****	****	****	****	****	****	*****
ST DEV	SURFACE	0.19	0.11	0.19	0.22	0.11	0.10	0.12	0.18	0.7	0.24
	BOTTOM	*****	*****	*****	*****	*****	*****	*****	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX I, TABLE 21 , NANTICOKE 1976

TOTAL IRON MG/L

STATION	DEPTH M	APR 14	MAY 12	JUN 9	JUL 7	AUG 3	AUG 31	SEP 30	OCT 13	MEAN	ST.DEV.
112	1.0	0.16	0.12	0.03	0.05	0.03	0.02	0.03	****	0.06	0.055
112	11.0	0.20	0.12	0.03	0.09	0.02	0.09	0.17	****	0.10	0.067
501	1.0	0.16	0.10	0.04	0.04	0.02	0.02	0.03	****	0.06	0.052
501	12.0	0.17	0.10	0.12	0.07	0.03	0.04	0.09	****	0.09	0.048
518	3.0	0.39	0.22	0.04	0.07	0.04	0.15	0.08	****	0.14	0.127
648	1.0	0.21	0.16	0.03	0.05	0.03	0.03	0.02	****	0.08	0.077
648	7.0	0.25	0.20	0.04	0.08	0.03	0.03	0.09	****	0.10	0.088
810	1.0	0.15	0.40	0.05	0.09	0.05	0.08	0.08	****	0.13	0.124
810	8.0	0.15	0.29	0.05	0.08	0.08	0.04	0.03	****	0.10	0.092
994	1.0	0.14	0.13	0.18	0.06	0.05	0.03	0.05	****	0.09	0.058
994	7.0	0.13	0.12	0.08	0.12	0.06	0.05	0.04	****	0.09	0.037
1016	1.0	0.15	0.81	0.13	0.08	0.05	0.06	0.03	****	0.19	0.278
1016	9.0	0.17	0.10	0.07	0.08	0.10	0.06	0.04	****	0.09	0.042
1040	3.0	0.43	0.38	0.08	0.08	0.09	0.07	0.06	****	0.17	0.161
1041	1.0	0.53	0.45	0.15	0.07	0.06	0.07	0.06	****	0.20	0.203
1041	9.0	0.46	0.16	0.11	0.08	0.07	0.10	0.06	****	0.15	0.141
1042	2.0	0.52	0.40	0.26	0.22	0.10	0.08	0.12	****	0.24	0.166
MEAN	SURFACE	0.28	0.32	0.10	0.08	0.05	0.06	0.06	****	0.14	0.151
	BOTTOM	0.22	0.16	0.07	0.09	0.06	0.06	0.07	****	0.10	0.078
ST DEV	SURFACE	0.164	0.219	0.078	0.051	0.026	0.040	0.031	*****	0.12	0.127
	BOTTOM	0.113	0.069	0.034	0.016	0.030	0.027	0.049	*****	****	*****

**** MEANS THAT THE RESULT IS NOT AVAILABLE

APPENDIX II

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                C                                                                       00000010
                C       ANALYSIS OF LONG-TERM TRENDS                                    00000020
                C       PROGRAM NEW MAY 18, 1977                                        00000030
                C       MODIFICATION MARCH 20, 1978                                     00000040
                C       J.POLAK, LAKE SYSTEMS,WATER RESOURCES BRANCH,                   00000050
                C                                                                       00000060
                C       MINISTRY OF THE ENVIRONMENT, 135 ST.CLAIR W.,                   00000070
                C       TORONTO, ONTARIO  M4V 1P5                                       00000080
                C                                                                       00000090
0001                    DIMENSION TITLE(18),A(9),AMN(150),ASTD(150),DT(150) ,NODAT(10)  00000100
0002                    DIMENSION AMIDM(9,8),TMIDM(9,8),X(150),Y(150),DETR(9,8)         00000110
0003                    DIMENSION AVY(10),SI(9,8),SIM(10),DES(9,8),DETRY(10)            00000120
0004                    DIMENSION DETDES(9,8)                                           00000130
0005                    DIMENSION SSS(10),TIT(5,3),AA(9,150),DTA(150)                   00000140
0006                    DATA TIT/'ALL ','STAT','IONS',2*'    ','NEAR','SHOR','E ST','ATIO'00000150
                       1,'NS  ','OFFS','HORE',' STA','TION','S   '/                     00000160
                C                                                                       00000170
                C          NOMM ... NO. OF SURVEY MONTHS (USUALLY 8)                    00000180
                C          NOMYMA  ...  MAX. DIMENSION IN ARRYAS (1969-1976 NOMYMA=8,   00000190
                C                                                1969-1977 NOMYMA=9 ETC.)00000200
                C          TO EXPAND PROGRAM CHANGE THESE TWO PARAMETERS AS WELL AS      00000210
                C          ALL DIMENSIONS                                               00000220
                                                                                        00000230
0007                    NOMM=8                                                          00000240
0008                    NOMYMA=9                                                        00000250
                C                                                                       00000260
                C       DATA FOR THE PROGRAM:                                           00000270
                C       CARD                                                            00000280
                C        1          TITLE (18A4)                                        00000290
                C        2          PARM(1)  PARM(2)...PARM(I)...PARM(9) DATE = ALL F5.0 00000300
                C        WHERE      FOR  I      DATA FOR STATION                        00000310
                C                     1              112                               00000320
                C                     2              501                               00000330
                C                     3              518                               00000340
                C                     4              648                               00000350
                C                     5              810                               00000360
                C                     6              994                               00000370
                C                     7             1008                               00000380
                C                     8             1016
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C                    9              1040                                    00000390
C       DATE IN NUMBER OF MONTHS SINCE JAN,1, 1969 (FOR THIS DATE            00000400
C       DATE=0,0).  EXAMPLE - APR,15,1970 = DATE=15,50                       00000410
C                                                                            00000420
C        3 ETC,    THE SAME AS CARD 2 FOR THE NEXT DATE                      00000430
C                                                                            00000440
C       LAST LINE:                                                           00000450
C                  -1,0     -1,0     -1,0     ETC,                         00000460
C       MISSING DATA POINTS ARE SUBSTITUTED BY 0,0 OR BLANK                  00000470
C                                                                            00000480
0009        1 READ (1,1000,END=75) TITLE                                     00000490
C                                                                            00000500
C            READ DATA                                                       00000510
C                                                                            00000520
0010          DO 3 L=1,150                                                   00000530
0011          READ (1,1010) (AA(K,L),K=1,9),DTA(L)                           00000540
0012          IF (AA(1,L).LT.0.0) GO TO 5                                    00000550
0013        3 CONTINUE                                                       00000560
0014        5 DO 70 INOFF=1,3                                                00000570
C                                                                            00000580
C            INOFF=1       DATA FOR ALL STATIONS                           00000590
C            INOFF=2       NEARSHORE (518,810,994,1008,1016,1040) ONLY     00000600
C            INOFF=3       OFFSHORE (112,501,648) STATIONS ONLY            00000610
C                                                                            00000620
0015          NOMP=0                                                         00000630
0016          NOM=0                                                          00000640
0017          DO 6 K=1,20                                                    00000650
0018        6 NODAT(K)=0                                                     00000660
0019          WRITE (6,1005) TITLE                                           00000670
0020          WRITE (6,1009) (TIT(L,INOFF),L=1,5)                            00000680
0021       1000 FORMAT (18A4)                                                00000690
0022       1005 FORMAT ('1'///1X,18A4)                                       00000700
0023       1009 FORMAT (1X,5A4)                                              00000710
0024         10 NOMP=NOMP+1                                                  00000720
0025            NOM=NOM+1                                                    00000730
0026            IF (AA(1,NOM).LT.0.0) GO TO 30                               00000740
C                                                                            00000750
C            TAKE ONE LINE OF DATA AND SUM ACCORDING TO THE INOFF VALUE      00000760
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      C                                                                 00000770
                                                                        00000780
                                                                        00000790
                                                                        00000800
                                                                        00000810
                                                                        00000820
                                                                        00000830
                                                                        00000840
                                                                        00000850
                                                                        00000860
                                                                        00000870
                                                                        00000880
                                                                        00000890
                                                                        00000900
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                                                                        00000940
                                                                        00000950
                                                                        00000960
                                                                        00000970
                                                                        00000980
                                                                        00000990
                                                                        00001000
                                                                        00001010
                                                                        00001020
                                                                        00001030
                                                                        00001040
                                                                        00001050
                                                                        00001060
                                                                        00001070
                                                                        00001080
                                                                        00001090
                                                                        00001100
                                                                        00001110
                                                                        00001120
                                                                        00001130
                                                                        00001140
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0064              DO 4 K=1,NOMY                                                  00001150
0065              DO 4 L=1,NOMM                                                  00001160
0066              AMIDM(K,L)=0.0                                                 00001170
0067              DETR(K,L)=0.0                                                  00001180
0068              SI(K,L)=0.0                                                    00001190
0069            4 DES(K,L)=0.0                                                   00001200
0070              DO 35 L=1,NOMY                                                 00001210
0071              IF (NODAT(L).EQ.0) NOMYY=NOMYY-1                               00001220
0072           35 CONTINUE                                                       00001230
                                                                                 00001240
                C                                                                00001250
                C         NOMYY ... NO. OF YEARS WITH EXISTING DATA, EXCLUDING YEARS 00001260
                C                   IN THE MIDDLE WITH NO DATA                   00001270
                C         NOMY  ... NO. OF YEARS UP TO THE LAST WITH EXISTING DATA AND 00001280
                C                   INCLUDING YEARS WITH NO DATA                 00001290
                C                                                                00001300
0073              NALL=NOMYY*NOMM                                                00001310
                C                                                                00001320
                C          INTERPOLATE TO THE MIDDLE OF THE MONTH,               00001330
                C          APR 15 TO NOV 15                                      00001340
                C                                                                00001350
0074              CALL EXTP(AMN,DT,AMIDM,TMIDM,NMIDM,NOMYMA,NOMY,NOMM,NYEAR1,NODAT) 00001360
0075              WRITE (6,1015)                                                 00001370
0076           1015 FORMAT (/3X,'N',2X,'MONTH',3X,'AVG.',4X,'ST.DEV.'/)          00001380
                C                                                                00001390
                C          LIST THE AVERAGES FOR THE DATES                       00001400
                C                                                                00001410
0077              DO 40 K=1,150                                                  00001420
0078              WRITE (6,1020) K,DT(K),AMN(K),ASTD(K)                          00001430
0079              IF (AMN(K).LT.0.0) GO TO 50                                    00001440
0080           1020 FORMAT (I4,F7.2,2F9.4)                                       00001450
0081             40 CONTINUE                                                     00001460
0082             50 WRITE (6,1008) TITLE                                         00001470
0083              WRITE (6,1009) (TIT(L,INOFF),L=1,5)                            00001480
0084           1008 FORMAT ('1'///1X,18A4///5X,'VALUES INTERPOLATED TO THE MIDDLE OF T00001490
                  1HE MONTHS:')                                                  00001500
                C                                                                00001510
                C          CALCULATE AVERAGES AND ST. DEVS. FOR INTERPOLATED DATA 00001520
                C
```

```
0085              CALL AVESTD (NOMY,NOMM,NYEAR1,AMIDM,NODAT,NOMYMA)                00001530
0086              L=0                                                              00001540
0087              DO 90 KY=NYEAR1,NOMY                                             00001550
0088              DO 90 KM=1,NOMM                                                  00001560
0089              IF (NODAT(KY).EQ.0) GO TO 90                                     00001570
0090              L=L+1                                                            00001580
0091              X(L)=TMIDM(KY,KM)                                                00001590
0092              Y(L)=AMIDM(KY,KM)                                                00001600
0093           90 CONTINUE                                                         00001610
                C                                                                  00001620
                C          CALCULATE THE LINEAR TREND OF THE DATA                  00001630
                C          INTERPOLATED TO THE MIDDLE OF THE MONTHS                00001640
                C                                                                  00001650
0094              CALL PLM(X,Y,NALL,TREND,SINTS)                                   00001660
0095              TM=(TMIDM(NYEAR1,1)+TMIDM(NOMY,NOMM))/2.0                        00001670
                C                                                                  00001680
                C          REMOVE LINEAR TREND = DATA=DETR                         00001690
                C                                                                  00001700
0096              DO 120 K=1,NOMY                                                  00001710
0097              AVY(K)=0.0                                                       00001720
0098           120 DETRY(K)=0.0                                                    00001730
0099              DO 130 KY=NYEAR1,NOMY                                            00001740
0100              DO 130 KM=1,NOMM                                                 00001750
0101              IF (NODAT(KY).EQ.0) GO TO 130                                    00001760
0102              DF=TM-TMIDM(KY,KM)                                               00001770
0103              DETR(KY,KM)=DF*TREND+AMIDM(KY,KM)                                00001780
0104              DETRY(KY)=DETRY(KY)+DETR(KY,KM)                                  00001790
0105              AVY(KY)=AVY(KY)+AMIDM(KY,KM)                                     00001800
0106           130 CONTINUE                                                        00001810
0107              DO 140 K=1,NOMY                                                  00001820
0108              AVY(K)=AVY(K)/NOMM                                               00001830
0109           140 DETRY(K)=DETRY(K)/NOMM                                          00001840
0110              WRITE (6,1100)                                                   00001850
0111          1100 FORMAT (//5X,'DETRENDED DATA:')                                 00001860
                C                                                                  00001870
                C          CALCULATE AVREAGES AND ST,DEVS AND PRINT DETRENDED DATA 00001880
                C                                                                  00001890
0112              CALL AVESTD (NOMY,NOMM,NYEAR1,DETR,NODAT,NOMYMA)                 00001900
```

```
                C                                                                   00001910
                C     DESEASONALIZATION OF DATA                                     00001920
                C     FIRST CALCULATE SEASONAL INDICES = SI                         00001930
                C                                                                   00001940
0113                  DO 80 K=1,NOMM                                                00001950
0114                  SIM(K)=0.0                                                    00001960
0115               80 SSS(K)=0.0                                                    00001970
0116                  DO 100 KY=NYEAR1,NOMY                                         00001980
0117                  DO 100 KM=1,NOMM                                              00001990
0118                  IF (NODAT(KY).EQ.0) GO TO 100                                 00002000
0119                  SI(KY,KM)=DETR(KY,KM)/DETRY(KY)*100.0                         00002010
0120                  SS=AMIDM(KY,KM)/AVY(KY)*100.0                                 00002020
0121                  SSS(KM)=SSS(KM)+SS                                            00002030
0122                  SIM(KM)=SIM(KM)+SI(KY,KM)                                     00002040
0123              100 CONTINUE                                                      00002050
0124                  DO 110 K=1,NOMM                                               00002060
0125                  SSS(K)=SSS(K)/NOMYY                                           00002070
0126              110 SIM(K)=SIM(K)/NOMYY                                           00002080
                                                                                    00002090
                C                                                                   00002100
                C          CALCULATE SEASONALLY ADJUSTED DATA (TREND NOT            00002110
                C          REMOVED) = DES                                           00002120
                C          AND DETRENDED AND SEASONALLY ADJUSTED DATA = DETDES      00002130
                C                                                                   00002140
0127                  DO 150 KY=NYEAR1,NOMY                                         00002150
0128                  DO 150 KM=1,NOMM                                              00002160
0129                  IF (NODAT(KY).EQ.0) GO TO 150                                 00002170
0130                  DES(KY,KM)=AMIDM(KY,KM)/SSS(KM)*100.0                         00002180
0131                  DETDES(KY,KM)=DETR(KY,KM)/SIM(KM)*100.0                       00002190
0132              150 CONTINUE                                                      00002200
                C                                                                   00002210
                C          PRINT EVERYTHING                                         00002220
                C                                                                   00002230
0133                  WRITE (6,1005) TITLE                                          00002240
0134                  WRITE (6,1009) (TIT(L,INOFF),L=1,5)                           00002250
0135                  WRITE (6,1060)                                                00002260
0136             1060 FORMAT (//5X,'TABLE OF SEASONAL INDICES (FOR DETRENDED DATA) :') 00002270
0137                  CALL AVESTD (NOMY,NOMM,NYEAR1,SI,NODAT,NOMYMA)                00002280
0138                  WRITE (6,1090)
```

```
0139          1090 FORMAT (//5X,'SEASONALLY ADJUSTED VALUES (TREND NOT REMOVED) :')   00002290
0140               CALL AVESTD (NOMY,NOMM,NYEAR1,DES,NODAT,NOMYMA)                    00002300
0141               WRITE (6,1110)                                                     00002310
0142          1110 FORMAT (//5X,'DETRENDED AND SEASONALLY ADJUSTED VALUES:')         00002320
0143               CALL AVESTD (NOMY,NOMM,NYEAR1,DETDES,NODAT,NOMYMA)                 00002330
0144               L=0                                                                00002340
0145               DO 170 KY=NYEAR1,NOMY                                              00002350
0146               DO 170 KM=1,NOMM                                                   00002360
0147               IF (NODAT(KY).EQ.0) GO TO 170                                      00002370
0148               L=L+1                                                              00002380
0149           170 Y(L)=DES(KY,KM)                                                    00002390
0150               WRITE (6,1005) TITLE                                               00002400
0151               WRITE (6,1009) (TIT(L,INOFF),L=1,5)                                00002410
0152               WRITE (6,1120)                                                     00002420
0153          1120 FORMAT (//5X,'SEASONALLY ADJUSTED DATA')                          00002430
0154               CALL PLM(X,Y,NALL,TREND,SINTS)                                     00002440
0155            70 CONTINUE                                                         00002450
0156               GO TO 1                                                          00002460
0157            75 STOP                                                             00002470
0158               END                                                              00002480
```

```
0001                SUBROUTINE EXTP (A,T,AE,TE,IRES,NOMYMA,NOMY,NOMM,NYEAR1,NODAT)     00002490
0002                DIMENSION A(1),T(1),AE(NOMYMA,NOMM),TE(NOMYMA,NOMM),AY(150),       00002500
                   1TY(150),NODAT(1)                                                   00002510
                C   INTERPOLATION OF VALUES TO MIDMONTH                               00002520
                C                                                                     00002530
                C   FROM APR 15 TO NOVEMBER 15                                       00002540
                C   STARTS AT APRIL 15,1969 AS 3,5                                    00002550
                C   THIS SUBROUTINE LIMITED TO 1969-1976                            00002560
                C   FOR LONGER TIME PERIOD EXPAND DIMENSIONS                        00002570
                C   MAX. 150 POINTS PER SET AND 50 DATA POINTS PER YEAR             00002580
                C                                                                     00002590
0003                DO 80 KYEAR=NYEAR1,NOMY                                         00002600
0004                IF (NODAT(KYEAR).EQ.0) GO TO 80                                 00002610
0005                TLOW=(KYEAR-1.0)*12.0                                           00002620
0006                THIGH=TLOW+12.0                                                 00002630
0007                IPY=0                                                           00002640
0008                AM=0.0                                                          00002650
0009                TM=0.0                                                          00002660
0010                DO 20 L=1,150                                                   00002670
0011                IF (A(L).LT.0.0) GO TO 30                                       00002680
0012                IF (T(L).LT.TLOW.OR.T(L).GT.THIGH) GO TO 20                     00002690
0013                IPY=IPY+1                                                       00002700
0014                AY(IPY)=A(L)                                                    00002710
0015                TY(IPY)=T(L)                                                    00002720
0016                AM=AM+AY(IPY)                                                   00002730
0017                TM=TM+TY(IPY)                                                   00002740
0018             20 CONTINUE                                                        00002750
0019             30 AY(IPY+1)=-1.0                                                  00002760
0020                TY(IPY+1)=-1.0                                                  00002770
0021                AM=AM/IPY                                                       00002780
0022                TM=TM/IPY                                                       00002790
0023                DO 70 L=1,8                                                     00002800
0024                TE(KYEAR,L)=(L-1)+3.5+(KYEAR-1)*12.0                            00002810
0025                TT=TE(KYEAR,L)                                                  00002820
0026                DO 40 N=1,150                                                   00002830
0027                IF (IPY.EQ.1) GO TO 55                                          00002840
0028                IF (TY(N).LT.0.0) GO TO 60                                      00002850
0029                IF (TY(N).EQ.TT) GO TO 50                                       00002860
```

```
0030              IF (TY(N).LT.TT) GO TO 40                              00002870
0031              IF (N.NE.1) GO TO 35                                   00002880
0032              AL=AM                                                  00002890
0033              AH=AM                                                  00002900
0034              TL=TY(1)                                               00002910
0035              TH=TM                                                  00002920
0036              GO TO 65                                               00002930
0037           35 AL=AY(N-1)                                             00002940
0038              AH=AY(N)                                               00002950
0039              TL=TY(N-1)                                             00002960
0040              TH=TY(N)                                               00002970
0041              GO TO 65                                               00002980
0042           40 CONTINUE                                               00002990
0043           60 AL=AM                                                  00003000
0044              AH=AM                                                  00003010
0045              TL=TM                                                  00003020
0046              TH=TY(N-1)                                             00003030
0047           65 AK=(AH-AL)/(TH-TL)                                     00003040
0048              AI=-AK*TL+AL                                           00003050
0049              AE(KYEAR,L)=AK*TT+AI                                   00003060
0050              GO TO 70                                               00003070
0051           55 AE(KYEAR,L)=AM                                         00003080
0052              GO TO 70                                               00003090
0053           50 AE(KYEAR,L)=AY(N)                                      00003100
0054           70 CONTINUE                                               00003110
0055           80 CONTINUE                                               00003120
0056              RETURN                                                 00003130
0057              END                                                    00003140
```

```
0001          SUBROUTINE TAB (A,AVM,AVY,SDM,SDY,AVG,SDG,NOMY,NOMM,NOMYMA)          00003150
                                                                                   00003160
              C                                                                    00003170
              C     PRINT OF THE TABLES                                            00003180
              C     THIS SUBROUTINE STARTS PRINTING AT 1969                        00003190
              C     NOMY=NO, OF YEARS, NOMM=NO, OF MONTHS                          00003200
              C                                                                    00003210
0002          DIMENSION A(NOMYMA,NOMM),AVM(1),AMO(16),AVY(1),SDY(1),SDM(1)         00003220
0003          DATA AMO/'APR ','15  ','MAY ','15  ','JUN ','15  ','JUL ','15  ',  00003230
             1'AUG ','15  ','SEP ','15  ','OCT ','15  ','NOV ','15  '/           00003240
             3 ,MEAN/'MEAN'/,STD/'ST.D'/                                           00003250
0004          WRITE (6,1000) (AMO(K),K=1,15,2)                                     00003260
0005       1000 FORMAT (/1X,'YEAR',8(4X,A4),4X,'AVG',5X,'ST.DEV'/)                 00003270
0006          NOMY0=1968                                                           00003280
0007          DO 20 K=1,NOMY                                                       00003290
0008          NOMY0=NOMY0+1                                                        00003300
0009          IF (A(K,1).GT.100.0) GO TO 60                                        00003310
0010          IF (A(K,1).GT.10.0) GO TO 70                                         00003320
0011          IF (A(K,1).GT.1.0) GO TO 80                                          00003330
0012          WRITE (6,1010) NOMY0,(A(K,KM),KM=1,NOMM),AVY(K),SDY(K)               00003340
0013          GO TO 20                                                             00003350
0014       60 WRITE (6,1020) NOMY0,(A(K,KM),KM=1,NOMM),AVY(K),SDY(K)               00003360
0015          GO TO 20                                                             00003370
0016       70 WRITE (6,1050) NOMY0,(A(K,KM),KM=1,NOMM),AVY(K),SDY(K)               00003380
0017          GO TO 20                                                             00003390
0018       80 WRITE (6,1060) NOMY0,(A(K,KM),KM=1,NOMM),AVY(K),SDY(K)               00003400
0019       20 CONTINUE                                                            00003410
0020       1010 FORMAT (1X,I4,9F8.4,F10.6)                                        00003420
0021       1020 FORMAT (1X,I4,9F8.1,F10.3)                                        00003430
0022       1050 FORMAT (1X,I4,9F8.2,F10.4)                                        00003440
0023       1060 FORMAT (1X,I4,9F8.3,F10.5)                                        00003450
0024          WRITE (6,1030)                                                       00003460
0025       1030 FORMAT (2X)                                                       00003470
0026          IF (AVM(1).GT.100.) GO TO 90                                         00003480
0027          IF (AVM(1).GT.10.) GO TO 100                                         00003490
0028          IF (AVM(1).GT.1.) GO TO 110                                          00003500
0029          WRITE (6,1070) MEAN,(AVM(L),L=1,NOMM),AVG,SDG                        00003510
0030          WRITE (6,1070) STD,(SDM(L),L=1,NOMM),SDG,SDG                         00003520
0031          GO TO 120
```

```
0032          90 WRITE (6,1080) MEAN,(AVM(L),L=1,NOMM),AVG,SDG                  00003530
0033             WRITE (6,1080) STD,(SDM(L),L=1,NOMM),SDG,SDG                   00003540
0034             GO TO 120                                                      00003550
0035         100 WRITE (6,1090) MEAN, (AVM(L),L=1,NOMM),AVG,SDG                 00003560
0036             WRITE (6,1090) STD,(SDM(L),L=1,NOMM),SDG,SDG                   00003570
0037             GO TO 120                                                      00003580
0038         110 WRITE (6,1100) MEAN,(AVM(L),L=1,NOMM),AVG,SDG                  00003590
0039             WRITE (6,1100) STD,(SDM(L),L=1,NOMM),SDG,SDG                   00003600
0040        1070 FORMAT (1X,A4,9F8.4,F10.6)                                     00003610
0041        1080 FORMAT (1X,A4,9F8.1,F10.3)                                     00003620
0042        1090 FORMAT (1X,A4,9F8.2,F10.4)                                     00003630
0043        1100 FORMAT (1X,A4,9F8.3,F10.5)                                     00003640
0044         120 RETURN                                                         00003650
0045             END                                                            00003660
```

```
0001                  SUBROUTINE PLM(X,Y,NOMP,SLOPE,SINTER)                                  00003670
                                                                                             00003680
                C                                                                            00003690
                C          LEAST SQUARE FIT OF THE STRAIGHT LINE                             00003700
                C          ALL ERRORS AND TESTING AT 95% CONFIDENCE LEVEL                    00003710
                C          MAX, 150 DATA POINTS IN THE SERIES                                00003720
                C                                                                            00003730
0002                  DIMENSION SOL (10),TT(31)                                              00003740
0003                  DIMENSION X(1),Y(1)                                                    00003750
0004                  COMMON XX(150),YY(150),NOMC                                            00003760
0005                  EXTERNAL FCE                                                           00003770
0006                  DATA TT/12.706,4.403,3.182,2.776,2.571,2.447,2.365,2.306,2.262,        00003780
                     12.228,2.201,2.179,2.160,2.145,2.131,2.120,2.11,2.101,2.093,2.086,      00003790
                     22.080,2.074,2.069,2.064,2.060,2.056,2.052,2.048,2.045,                 00003800
                     32.042,1.96/                                                            00003810
0007                   DO 10 K=1,150                                                         00003820
0008                   XX(K)=X(K)                                                            00003830
0009                10 YY(K)=Y(K)                                                            00003840
0010                35 NOMC=2                                                                00003850
0011                   CALL JPSQLN (2,3,NOMP,FCE,SOL)                                        00003860
0012                   SLOPE=SOL(2)                                                          00003870
0013                   SINTER=SOL(1)                                                         00003880
0014                   WRITE (6,36)                                                          00003890
0015                36 FORMAT (///1X,'CALCULATED LINEAR TRENDS')                             00003900
0016                   WRITE (6,40) SOL(2),SOL(1)                                            00003910
0017                40 FORMAT (//3X,'EQUATION  Y = KX + Q,',2X,'K =',F10.5,2X,'Q =',       00003920
                     1F10.5/)                                                                00003930
0018                   SUM=0.0                                                               00003940
0019                   SX=0.0                                                                00003950
0020                   SY=0.0                                                                00003960
0021                   SX2=0.0                                                               00003970
0022                   SY2=0.0                                                               00003980
0023                   SXY=0.0                                                               00003990
0024                   DO 50 K=1,NOMP                                                        00004000
0025                   SX=SX+X(K)                                                            00004010
0026                   SY=SY+Y(K)                                                            00004020
0027                   SX2=SX2+X(K)*X(K)                                                     00004030
0028                   SY2=SY2+Y(K)*Y(K)                                                     00004040
0029                50 SXY=SXY+X(K)*Y(K)
```

```
0030              XM=SX/NOMP                                                    00004050
0031              YM=SY/NOMP                                                    00004060
0032              SPX2=0.0                                                      00004070
0033              SPY2=0.0                                                      00004080
0034              SPXY=0.0                                                      00004090
0035              DO 70 K=1,NOMP                                                00004100
0036              SPX2=SPX2+(X(K)-XM)**2                                        00004110
0037              SPY2=SPY2+(Y(K)-YM)**2                                        00004120
0038               70 SPXY=SPXY+(X(K)-XM)*(Y(K)-YM)                             00004130
0039              R=SOL(2)*SQRT(SPX2/SPY2)                                      00004140
0040              WRITE (6,110) R                                               00004150
0041             110 FORMAT (/3X,'CORRELATION COEFF, =',F10,5)                  00004160
0042              RSQ=R*R                                                       00004170
0043              VARY=(SPY2-SOL(2)*SPXY)/(NOMP-2)                              00004180
0044              VARSL=VARY/SPX2                                               00004190
0045              VARYM=VARY/NOMP                                               00004200
0046              SVARSL=SQRT(VARSL)                                            00004210
0047              SVARYM=SQRT(VARYM)                                            00004220
0048              WRITE (6,160) RSQ                                             00004230
0049             160 FORMAT (3X,'SQUARE CORR, COEFF,=',F10,5)                   00004240
0050              NDF=NOMP-2                                                    00004250
0051              IF  (NDF.GT.30)  GO  TO  120                                  00004260
0052              TTAB=TT(NDF)                                                  00004270
0053              GO  TO  130                                                   00004280
0054             120 TTAB=TT(31)                                                00004290
0055             130 YMCONF=TTAB*SVARYM                                         00004300
0056              SLCONF=TTAB*SVARSL                                            00004310
0057              ROC1=(SOL(2)-SLCONF)*12.0                                     00004320
0058              ROC2=SOL(2)*12.0                                              00004330
0059              ROC3=(SOL(2)+SLCONF)*12.0                                     00004340
0060              PROC1=ROC1/YM*100.0                                           00004350
0061              PROC2=ROC2/YM*100.0                                           00004360
0062              PROC3=ROC3/YM*100.0                                           00004370
0063              WRITE (6,200) XM                                              00004380
0064             200 FORMAT (3X,'MEAN X =',F12.5)                               00004390
0065              WRITE (6,170) YM,YMCONF                                       00004400
0066             170 FORMAT (3X,'MEAN Y =',F12.5,'  (+-)',F12.5)                00004410
0067              WRITE (6,180) SOL(2),SLCONF                                   00004420
```

```
0068          180 FORMAT (3X,'SLOPE  =',F12.5,'  (+=)',F12.5)                    00004430
0069              WRITE (6,210) ROC2,ROC3,ROC1,PROC2,PROC3,PROC1                 00004440
0070          210 FORMAT (/3X,'-------------YEARLY CHANGE-------------'/10X,     00004450
                 1'MEAN',9X,'MAX',10X,'MIN'/3X,'Y',3F13.5/3X,'%',F10.2,2F13.2)  00004460
                                                                                00004470
0071              RETURN                                                        00004480
0072              END
```

```
0001                  SUBROUTINE JPSQLN (NOC,NOCP1,NOMP,F,SOL)                  00004490
                                                                                00004500
                C                                                               00004510
                C          CALCULATION OF NORMAL EQUATIONS                      00004520
                C                                                               00004530
0002                  DIMENSION AA(2,3),SOL(1)                                  00004540
0003                  DO 909 I=1,NOC                                            00004550
0004                  DO 909 J=1,NOCP1                                          00004560
0005                909 AA(I,J)=0.0                                             00004570
0006                  DO 910 I=1,NOMP                                           00004580
0007                  DO 910 J=1,NOC                                            00004590
0008                  DO 910 K=J,NOCP1                                          00004600
0009                910 AA(J,K)=AA(J,K)+F(J,I)*F(K,I)                           00004610
0010                  DO 911 J=2,NOC                                            00004620
0011                  L=J-1                                                     00004630
0012                  DO 911 K=1,L                                              00004640
0013                911 AA(J,K)=AA(K,J)                                         00004650
0014                  CALL JPSOLV(NOC,NOCP1,AA,SOL)                             00004660
0015                  RETURN                                                    00004670
0016                  END
```

```
0001                  SUBROUTINE JPSOLV(NOC,NOCP1,AA,SOL)                    00004680
                      C                                                      00004690
                      C          SOLUTION OF THE SET OF LINEAR EQUATIONS     00004700
                      C                                                      00004710
0002                  DIMENSION AA(NOC,NOCP1),SOL(1)                         00004720
0003                900 DO 903 K=1,NOC                                       00004730
0004                  AJM=AA(K,K)                                            00004740
0005                  DO 901 L=K,NOCP1                                       00004750
0006                901 AA(K,L)=AA(K,L)/AJM                                  00004760
0007                  I1=K+1                                                 00004770
0008                  IF (I1-NOCP1) 902,904,904                              00004780
0009                902 DO 903 I=I1,NOC                                      00004790
0010                  AJK=AA(I,K)                                            00004800
0011                  DO 903 L=K,NOCP1                                       00004810
0012                903 AA(I,L)=AA(I,L)-AA(K,L)*AJK                          00004820
0013                904 SOL(NOC)=AA(NOC,NOCP1)                               00004830
0014                  I=NOC                                                  00004840
0015                905 SI=0.0                                               00004850
0016                  DO 906 L=I,NOC                                         00004860
0017                906 SI=SI+AA(I-1,L)*SOL(L)                               00004870
0018                  I=I-1                                                  00004880
0019                  SOL(I)=AA(I,NOCP1)-SI                                  00004890
0020                907 IF (I-1) 908,908,905                                 00004900
0021                908 RETURN                                               00004910
0022                  END                                                    00004920
```

```
0001                REAL FUNCTION FCE (J,K)                                  00004930
                    C                                                        00004940
                    C       FUNCTION FOR JPSQLN                              00004950
                    C                                                        00004960
0002                COMMON X(150),Y(150),NOMC                                00004970
0003                IF (J.GT.NOMC) GO TO 10                                  00004980
0004                FCE=X(K)**(J-1)                                          00004990
0005                RETURN                                                   00005000
0006              10 FCE=Y(K)                                                00005010
0007                RETURN                                                   00005020
0008                END                                                      00005030
```

```
0001            SUBROUTINE AVESTD (NOMY,NOMM,NYEAR1,AA,NODAT,NOMYMA)                00005040
                C                                                                   00005050
                C       SUBROUTINE TO CALCULATE MEANS AND STANDARD DEVIATIONS       00005060
                C       OF ARRAY IN AA, AND TO PRINT THE TABLE                      00005070
                C       NOMY ... NO. OF THE LAST YEAR WITH GOOD DATA                00005080
                C       NOMM ... NO. OF MONTHS (USUALLY 8, STARTING IN APRIL)       00005090
                C       AA   ... ARRAY (NOMY X NOMM)                                00005100
                C       NYEAR1   FIRST YEAR WITH DATA (1969 OR LATER)               00005110
                C       NODAT    ARRAY - IF NODAT(K)=0 NO DATA NOR THE YEAR K       00005120
                C                                                                   00005130
0002            DIMENSION AA(NOMYMA,NOMM),AVY(20),AVM(12),SDY(20)                   00005140
0003            DIMENSION SDM(12),NODAT(1)                                          00005150
0004            DO 10 K=1,NOMM                                                      00005160
0005            AVM(K)=0.0                                                          00005170
0006         10 SDM(K)=0.0                                                          00005180
0007            DO 20 K=1,NOMY                                                      00005190
0008            AVY(K)=0.0                                                          00005200
0009         20 SDY(K)=0.0                                                          00005210
0010            AVG=0.0                                                             00005220
0011            SDG=0.0                                                             00005230
0012            NALL=0                                                              00005240
0013            DO 30 KM=1,NOMM                                                     00005250
0014            DO 30 KY=NYEAR1,NOMY                                                00005260
0015            IF (NODAT(KY).EQ.0) GO TO 30                                        00005270
0016            A=AA(KY,KM)                                                         00005280
0017            AVY(KY)=AVY(KY)+A                                                   00005290
0018            SDY(KY)=SDY(KY)+A*A                                                 00005300
0019            AVM(KM)=AVM(KM)+A                                                   00005310
0020            SDM(KM)=SDM(KM)+A*A                                                 00005320
0021            NALL=NALL+1                                                         00005330
0022            AVG=AVG+A                                                           00005340
0023            SDG=SDG+A*A                                                         00005350
0024         30 CONTINUE                                                            00005360
0025            IF (NALL.GT.1)  GO TO 60                                            00005370
0026            SDG=0.0                                                             00005380
0027            GO TO 70                                                            00005390
0028         60 SDG=SQRT (ABS(SDG-AVG*AVG/NALL)/(NALL-1.0))                         00005400
0029         70 AVG=AVG/NALL                                                        00005410
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```
0030              NY=NOMY                                                                00005420
0031              DO 100 K=1,NOMY                                                        00005430
0032              IF (NODAT(K).EQ.0) NY=NY-1                                             00005440
0033            100 CONTINUE                                                             00005450
0034              DO 40 K=1,NOMM                                                         00005460
0035              IF (NY.GT.1) GO TO 80                                                  00005470
0036              SDM(K)=0.0                                                             00005480
0037              GO TO 40                                                               00005490
0038             80 SDM(K)=SQRT(ABS(SDM(K)-AVM(K)*AVM(K)/NY)/(NY-1.0))                   00005500
0039             40 AVM(K)=AVM(K)/NY                                                     00005510
0040              DO 50 K=1,NOMY                                                         00005520
0041              IF (NODAT(K).EQ.0) GO TO 50                                            00005530
0042              IF (NOMM.GT.1) GO TO 90                                                00005540
0043              SDY(K)=0.0                                                             00005550
0044              GO TO 110                                                              00005560
0045             90 SDY(K)=SQRT (ABS(SDY(K)-AVY(K)*AVY(K)/NOMM)/(NOMM-1.0))              00005570
0046            110 AVY(K)=AVY(K)/NOMM                                                   00005580
0047             50 CONTINUE                                                            00005590
0048              CALL TAB(AA,AVM,AVY,SDM,SDY,AVG,SDG,NOMY,NOMM,NOMYMA)                  00005600
0049              RETURN                                                                 00005610
0050              END                                                                    00005620
```